BEYOND WAR

VERNON L. KELLOGG

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BEYOND WAR

A CHAPTER IN THE NATURAL HISTORY OF MAN

BY

VERNON LYMAN KELLOGG
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NEW YORK
HENRY HOLT AND COMPANY
1912

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Published March, 1912

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TO

D. S. J.

TEACHER, COLLEAGUE, AND FRIEND

PREFATORY NOTE

THIS book is not an essay to debate the virtues or evils of war. It is an attempt merely to set out plainly certain unadorned facts in the natural history of Man. These facts seem, however, to the author, to carry their own obvious significance in relation to the serious question of the probable continuance or discontinuance of human warfare.

They are facts which come more especially, and perhaps more readily, under the cognizance of the biologist than of the historian, economist, or philanthropist; and it is wholly from the point of view—and from the point of advantage or disadvantage—of the biologist that the book is written.

The author believes that the study of the natural history of Man is immensely more important than the study of his political history: at least, when this study has for its more immediate end the discovery of light upon Man's probable future behavior and evolutionary progress. If for no other reason this greater importance should result from the much longer period of Man's existence taken under observation. For while the lives of particular men during the prehistoric period are mostly unknowable, yet the general, and in many regards specific, manner of the life of Man in prehistoric times is known with perhaps as close an approximation to accuracy as this life in the earlier days of written history. Much written history seems no less open to criticism on the score of just interpretation of facts—let alone the score of accurate observation and recording of facts—than much human pre-history and paleontology.

The practical-minded reader may hold my point of view and treatment of the question of the relation of human evolution to War as too barren of suggestion or help in the solution of any present pressing human problem. To consider Man in terms of evolutionary time and achievement is too academic a performance for utility. If so I can only hope that it may not be, at any rate, wholly without interest. It may at least contain in it some encouragement to him who considers the generations to come.

V. L. K.

Carmel-by-the-Sea, Calif.,
January, 1912.

CONTENTS

CHAPTER PAGE

I. MAN AS SPECIES 1

II. *HOMO PRIMIGENIUS:* MAN OF THE GREAT ICE 20

III. *HOMO PRISCUS:* MAN AFTER THE ICE . . 52

IV. *HOMO SAPIENS:* MAN OF HISTORY . . 78

V. HUMAN NATURE, A PRODUCT AND SUBJECT OF EVOLUTION 102

VI. FIGHTING, BATTLES, WAR, AND NO WAR . 121

VII. *HOMO SUPERIORIS:* MAN OF TO-MORROW . 142

CHAPTER I

MAN AS SPECIES

Some of the sounds coming in through the open window this cool August morning remind me how earnestly man is trying to conduct his life in the light of scientific knowledge. There has been a good deal of going and coming at my neighbor's. Just now a second physician has driven up rapidly with a tank of oxygen in his carriage. I know enough of my neighbor's affairs—as one does in a village where we live humanly interested in one another—to know that he is dying this morning. He is a simple, sweet, very tired old gentleman of eighty-nine, and rather wishes to die. He exemplifies that pleasant condition that Metchnikoff looks forward to as a desirable probability of our evolution and our triumph over untimely disease and death, where we shall all come to the desire of death, not through disappointment or morbid despair, but through having fulfilled life. And we shall welcome the cessation of life just as in our great days we welcomed its continuance.

But my neighbor's friends and his two physicians, rich in the present knowledge of science and medicine, are prolonging the vegetative life of the moribund old man with oxygen and stimulants that rack his body and defeat his great need. This need is simply that of ceasing to live useless, painful, and mentally empty, therefore superfluous, hours.

Punctuating these sounds from my neighbor's dooryard come some from farther away: low, heavy, distant, but repeated, insistent sounds that strike the ears with muffled blows, and are perfectly recognizable to me for what they truly are, because I have investigated similar ones before. They are the sounds of the shots of the soldiers at the Monterey Presidio in the pines on the hill slope over the ocean, firing singly and by platoons at man-size and man-form targets in the forest. The hilltop over the ocean looks toward Japan, and the man-form metal targets, that fall over dramatically when struck above the middle, seem to me of rather small man-size.

The Monterey Presidio, although of ancient history as America reckons ancientness—for there the soldiers and priests once guarded and prayed over the old Spanish capital of California—is a modern garrison with modern administration. The well-trained officers teach the well-cared-for soldiers all the hideous secrets of modern scientific warfare. They have them practise assiduously with smokeless powder cartridges in wonderful guns at man-form targets scattered realistically among the trees and bushes of the hillside.

If these targets were replaced by Japanese men between the ages of twenty and forty, men in the very bud and unfaded blossom of life, specially picked indeed for the fullness and purity of the blood in their bodies, each time one went over because struck above the middle, a human being would be put by the success of modern science as applied to war into the condition of my neighbor who is dying. And yet oddly enough the modern science of benevolence is doing all that it can to prevent my used-up and death-desiring and death-needing neighbor from dying.

Man is earnest in these inconsistencies, and they should not be laughed nor sneered at. Rather they must be taken seriously, inquired about earnestly, and made to stimulate us to seek for their explanation and their significance.

In the Japanese war hundreds of shot, able-bodied young men were allowed to die slowly in unspeakable agony in the trenches of 203-Metre Hill, their sufferings vividly manifest to their comrades in arms and even brothers in blood a few rods away, and their bodies, after relieving death had come, allowed to rot among the newer dying, with horrible stench and repulsive deformity, because of the exigencies of the successful pursuit of a modern struggle for commercial and territorial supremacy. And yet in every hamlet in the civilized world man struggles every day to relieve the suffering and prolong the days of other men whose ebb of life from old age or hopeless weakness can certainly never and ought not ever return. An accident on the street, a fire in an hotel, the crashing of trains, all call forth the most strenuous, the most highly organized, the most scientifically administered of altruistic efforts to save life, to relieve suffering, often to prolong useless hours.

In the California earthquake of 1906, the upper floors of part of one of the state insane asylums were wrecked, and several poor mindless wretches were caught in the crushing débris. I shall never forget the excited pity and straining sympathy of the gathered spectators and the earnest and even perilously heroic struggles of attendants and volunteers to relieve these useless and even dangerous human beings. And all those who were not caught in the wreck but who, in the excitement of the hours, escaped, were assiduously sought and brought back, not alone for the sake of protecting society from a horde of gibbering animals, but for the sake of protecting them and maintaining them in physical well-being during the rest of their life of mental and psychic nothingness.

But mistakes in practical altruism do not discredit altruism. They only show the incompleteness of our evolution from selfish individualists to sane altruists. These mistakes are only incidents in the enormous and soul-developing altruistic activity of the human species; an activity that is one of the few really distinguishing and almost peculiar characters of man as compared with the half-million different other kinds of animals. The altruistic ants and bees and other few score of "mutual aid" animal kinds do not much interfere with our generalization. Indeed in the success in life of these insect altruists within their possibilities, we have an observational fact of much encouragement to us plodding along the altruistic path which is, for better or for worse, the unescapable line of human evolution.

But if we are altruists by evolution, and intelligent ones, why do we still have War?

We are, despite any self-satisfaction that it may please us to assume in our rôle of end-product of animal evolution and center of the Universe, not yet at the extreme end of that animal line that began with *Pithecanthropus* and is now running through *Homo*. Just as certain as that Man was different from us as a species in the time of the Great Ice, different structurally, different in habit and different in human nature, so certain is it that Man of another fifty thousand or hundred thousand years hence will differ again from us. The law of Nature is change, and change to new things, and Man's place is in Nature. Change in nature is Evolution, and Man is a product and a subject of Evolution.

As a species Man may change—I hold he will—to an animal to whom intraspecific War, at least War of blood and bullets, will be unknown and unthinkable. That he is not that, not wholly that yet, although swiftly becoming that under our very eyes, we may admit. And that is one reason why, intelligently altruistic as Man as a species is, we may still have War. He is intelligently altruistic but not sufficiently intelligent nor sufficiently altruistic wholly to put aside War on the one hand, and mistaken conservation of hopeless individuals on the other. But the latter unreasonableness is far less serious an impediment to the successful unfolding of our species destiny than the former, for the mistaken conservation of individuals is a direct outcome of the altruistic spirit in us, and only adds an economic burden and occasional slipback in heredity. War, on the other hand, not only imposes on us a great burden—at the same time robbing us of exactly those who are best able to bear burdens—and increases greatly the slipbacks in heredity, but its maintenance is a retention of a primitive animal characteristic, which retards our altruistic evolution.

But another reason why we still have War, and still shall have for a few generations even after Man has reached the no-War stage, *as a species,* is that an animal species shows in the mass of individuals that compose it never an identity but always a diversity, and some of this diversity can be definitely foretold. There is always a diversity according to the law of error.

No two animals in this world are exactly alike; they differ in all their structure and all their functions, in their mind and their behavior. No one is exactly like any other one that is or was or will be. Whether cousins of a remote degree or offspring born of a common mother, there are always differences. But these differences differ in degree, and by the littleness or largeness of the degree of differences do naturalists classify and arrange and pronounce on the relationships of the animals—and the plants likewise—that they know. They have determined certain rather arbitrary and conveniently limited categories of likeness and difference, or, better, of blood relationship, which relationship, whether near or wide, betrays itself by degrees of difference. These categories they name phyla, classes, orders, family, genera, and species.

The lowest unit of grouping is the species, and while a definition of a species is difficult to formulate in words, the idea of a species is sufficiently distinct and commonly accepted by naturalists to allow it to be practically used to great advantage in the study of animal life. The species is composed of individuals which, though inevitably differing, do so in such small degree as not to hide from naturalist, nor usually from layman, the fact that all these individuals really represent one kind, one common type of animal. These individuals of a single species have also the physiological commonness of being able to mate together and produce offspring that are themselves capable of producing young by mating with each other or with other individuals of the parental type. And the individuals of one species cannot usually thus successfully mate with individuals of another species, or, at least, by such mating produce fertile offspring.

The members of a species may be brothers, sisters, cousins, second cousins, fathers, mothers, grandparents, great-grandparents, and other ancestors and relatives far beyond categorical naming, but all so closely related by blood, and hence so much alike in structural make-up, physiology, behavior, and animal nature—which is what we may generically call cat or dog or fly or tapeworm nature, as contrasted with human nature—that we recognize them as of one kind. In this way the biologist recognizes all living human beings as of one animal kind, one species. The differences between living human beings—and by living I mean living in the present geological day, which began perhaps ten thousand years ago, and may stretch over another ten or double ten thousand years to come—the differences among all these human beings, these present-day men, are, I say, so slight in the eyes of naturalists, as great and obvious as these differences may seem to you and me, because so much more familiar and important to us as individualized members of the species, that the naturalists who study Man call us all members of one species, the present-day Man species, *Homo sapiens.* They emphasize Man's considerable difference from the other animals by declaring that he is the single species in his genus, *Homo,* and that his genus is the only one in its family, the *Hominidæ.* But his family and four families of monkeys and apes are grouped together to compose the order *Primates,* which is one of the eight orders into which the class *Mammalia* is subdivided.

However, although all men belong to one species, we are not all alike; we know that. And neither are the individuals of any other animal species all alike. Not all house flies are alike, nor are all wood thrushes, nor all royal Bengal tigers. The individuals of any species are indeed all different.

Now these differences, this diversity inside the species, may be and has been carefully studied. And students of men and of tigers and of house flies, have come to recognize that it is not any one individual of a species whose characteristics, structural and physiological, define the species, but it is the sum of the characteristics of the individuals which compose what we call the mode of the species that defines the species. And just as there is a mode for the species, so is there a mode for any characteristic of the species. Indeed it is more accurate to say that it is the sum of the modes of the characteristics that defines the species than to say what I did in the preceding sentence.

The meaning and method of determination of these specific modes are easily made clear.

If we were asked to tell a visitor from Mars what is the height of Man on earth we should not be certain to tell the truth if we took any man at random and measured him and announced his height to be that characteristic of the species. There are dwarf men and giants. And even the mean between an extra tall man and an extra short one might be no little way from the usual, or average, or, better, modal height of man. For this modal height is that represented by more men than represent any other height. In 25,000 measured American recruits the height varied from 59 inches to 74 inches. But only a few men were of the lowest and only a few of the greatest figure. Four thousand and fifty-four men were between 65 and 66 inches high; 3,631 were between 66 and 67 inches, while 3,475 were between 64 and 65 inches; 3,133 were between 67 and 68 inches, and 3,019 were between 63 and 64. And successively fewer were between 68 and 69 inches and 62 and 63 inches, and 69 and 70 inches and 61 and 62 inches, and so on in decreasing number out both ways to the extreme of the range. Now 65 to 66 inches represents the *mode* of height of American men, and the deviations from this mode up and down occur nearly exactly according to the law of error (law of probability or chance). This variability of the human species as regards the characteristic height is graphically expressed in Fig. 1, which shows the total range, the frequency of the various heights between the extremes of the range, and the mode or height of greatest frequency. This mode happens to be also the mean, or average. It is not necessarily so, however, for all characteristics. It can be nearer one extreme than the other, and then the variability curve or polygon will have

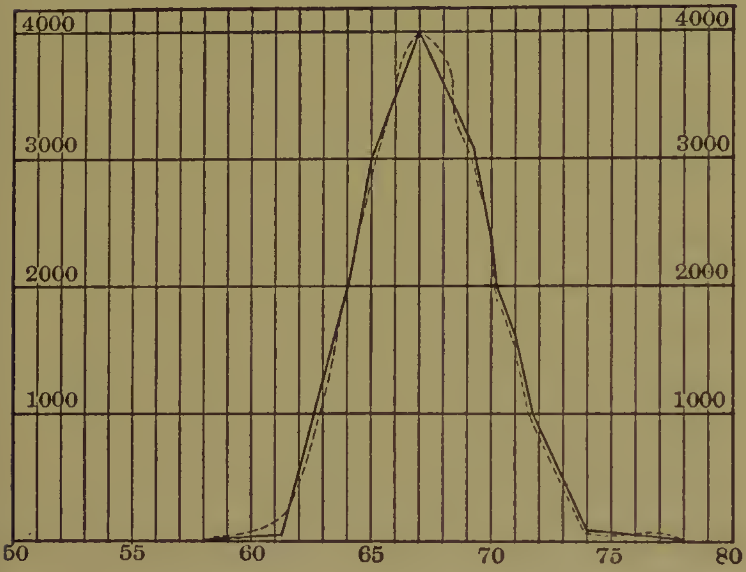

FIG. 1.—Diagram showing height (inches) of 25,878 recruits.

its highest point away from the middle, and the curve or polygon is said to skew.

But a normal variability according to the law of error, expressible by a symmetrical curve, occurs for nearly every specific characteristic of all plant and animal species. Each characteristic, structural and physiological, varies plus-ward and minus-ward about equal distances from a central modal or average condition. The species type is determined by the sum of the modes of the characteristics. It is the existence of modes that gives the species unity, while it is the existence of inevitable deviations from the modes that gives it diversity. In a fixed species, if such exists, the mode remains the same from generation to generation and the diversity also the same. But there is no really fixed species. There is always change, rapid or slow, going on in all species. In the species Man this change has gone on with appreciable rapidity in the last one hundred thousand years. The structural changes are readily measurable. The physiological changes are no less certain. The psychic changes are even more pronounced.

The change in species occurs, outside of occasional possible small radical leaps, the so-called mutations of modern evolutionists, by a shifting of the mode toward one or the other ends of the range of variability. It is a slow traveling plus-ward or minus-ward on the part of one or two or several or many characteristics, as a result of the constant working on the species of evolutionary factors, whose precise nature yet remains much of a mystery to biologists. The action of natural selection has, since Darwin's day, been recognized as one of these factors, one variously estimated in value by the scholars of the different schools: overestimated probably by the Neo-Darwinians, underestimated by the Neo-Lamarckians.

Other factors are named Orthogenesis or Determinate Variation, Inherited Acquirements, Orthoplasy, Isolation, Vitalistic Entelechies, Heterogenesis, Bathmism, Metakinesis, and latest, and most popular at the present writing, *l'Évolution Créatrice* (Bergson). The words mean little to us and the particular ideas they stand for need not trouble us now. But the basic fact and significance in them all is that they are attempts to account for a change that actually does obviously occur; and keeps occurring all the time in all animal life.

Evolution is real: and Evolution is change; and on the whole, despite lines of degeneration and of sidewise specializations running into *culs-de-sac,* it is change plus-ward, or upward. It is Progress. Man is in the big brutal grasp of this world force we call Organic Evolution, and every one of his characteristics, physical, mental, and psychic, is subject to the dragging pull of his Evolution master; his maker and his modifier; his nearly absolute overlord.

But this change never modifies all the individuals of his species at once. It modifies the *mode.* And there are always individuals, thousands, millions of individuals, lagging behind the mode; just as there are thousands, even millions of individuals, in front of the mode. The mode determines the real status of the species, but both the variants plus-ward of the mode and those minus-ward of the mode can be seen and heard. They are part of the species: but one group of them is doomed to fall out of it, the other to become the typical representatives of it.

And thus it is why War will not be ended for Man until the human evolutionary status as regards the characteristic Warring is represented by a mode well beyond War. How this mode, which is, of course, not that of a single human characteristic but of the sum of many, has stood and moved in the past history of Man, in that dramatic history since his first emergence as Man from the welter of lower life a hundred thousand or a million years ago—years are sorry time units in connection with the study of the natural history of the human species—it is the attempt of the following chapters to depict.

CHAPTER II

HOMO PRIMIGENIUS: MAN OF THE GREAT ICE

The geologists and paleontologists have no such convenient and definite time units for their science as the historian has for his. Earth history and life history reck little of years, because "there are no chronometers in nature that register so small a unit of time." The antiquity of man is to be measured only by the sequence of geological events, the changes in animal life, and the advance of man in culture.

Geologists have a sort of scale of earth-time, using units that vary in the hands of each measurer, and that are units less of time than of geological and evolutionary action. This scale is determined by the combination of a rough vertical section of the earth's crust with a rough ascending series in the appearance of plant and animal life. It divides earth-time and the evolution of organisms into eras, ages, periods, etc., categories of different rank, the lesser included within the greater, but without any uniformity of actual time or crustal thickness or evolutionary activity in corresponding categories. Like the light-years and other units of the astronomers, these units of the geologist are such immensities in terms of time as to be almost beyond our powers of conception.

At the bottom of the geologist's scale is the great Archeic era in which the hot earth was without life. In the womb of the Mother of Man there was not even the first stirring. But with the passing of inconceivable time and after radical changes in atmosphere, water, light, and temperature, came the labors which produced the first life, the spontaneous generation of the Moneron. In the warm ocean that was earth the simplest living things flourished and multiplied exceedingly, but of variety of life there was little.

In Cambrian time diversity had come, but it was diversity only among simple or lower types of animals. There were as yet only invertebrates, and of invertebrates so far no insects nor other terrestrial groups. In the Silurian Age appeared the first vertebrates, primitive fishes with mailed skin and cartilaginous skeleton. In the Devonian Age fishes were abundant and various of form, and with them appeared the first amphibians. In the Carboniferous Age, with its growing land areas, and its great forest flora, there was a notable increase in air-breathing terrestrial, animal kinds, and the first reptiles made their appearance. Thus ended the Paleozoic Era.

In the Mesozoic Era came the first birds and mammals, beginning with the birds with teeth, and with the low marsupial mammals whose few descendants live to-day as the opossums of the New World and the kangaroos and wallabies of Australia, that geographic backwater of primitive life. With the Cretaceous Age, age of the great saurians and the flying lizards, the Mesozoic Era went out

AGES.	Eras.	Animals especially characteristic of the age or epoch.
CENOZOIC. AGE OF MAMMALS.	Quaternary or Pleistocene (Era of man and insects).	Man; the mammals mostly of species still living.
	Tertiary { Pliocene. Miocene. Eocene.	Mammals abundant; belonging to numerous extinct families and orders.
MESOZOIC. AGE OF REPTILES.	Cretaceous.	Bird-like reptiles; flying reptiles; toothed birds; first snakes; bony fishes.
	Jurassic.	First birds; giant reptiles; ammonites; clams and snails abundant.
	Triassic.	First mammals (a marsupial, lowest kind of mammals).
PALEOZOIC. AGE OF INVERTEBRATES.	Carboniferous (Era of amphibians).	Earliest true reptiles. Amphibians. First crayfishes; insects abundant; spiders; fresh-water mussels.
	Devonian (Era of fishes).	First amphibian (frog-like animals); cartilaginous fishes, shark-like or mailed; first land shells (snails); shell-fish abundant; first crabs.
	Silurian (Era of invertebrates).	First truly terrestrial or air-breathing animals; first insects; corals abundant; mailed fishes.
	Ordovician or Lower Silurian.	First fishes, probably shark-like with cartilaginous skeleton; brachiopods; trilobites, mollusks, etc.
	Cambrian.	Invertebrates only.
ARCHEAN.	Algonkian. Laurentian.	Simple marine invertebrates.

FIG. 2.

without heralding by any least sign the coming of the King of Mammals.

The Cenozoic, our present Era, followed. Its first great subdivision, the Tertiary Age, came and has gone, and we do not yet know whether before it had run its millions of years of length there had appeared that proud creature to whom we shall of a certainty, when the genealogist has told his whole story, carry back our ancestor homage. Tertiary Man is a being or non-being who serves today as an inexhaustible subject of debate among paleontologists and anthropologists. Such scholars as Rutot, Klaatsch, Schoetensack, Verworn, and others are sure that he is real: such other scholars as Boyd Dawkins, the Abbé Breuil, Boule, Hörnes, and Zittel are equally certain that he is, at least, not proved to be real.

The evidence for Tertiary Man is, first, the logical inference that as post-Tertiary Man appears immediately after the close of the Tertiary in a truly man type of structure and behavior, he must have had as prototype a Tertiary ancestor much more man-like than ape-like or than like any other animal. And second, the evidence is the direct observational one of the occurrence through a great part of the Tertiary Age, namely the Miocene and Pliocene periods (even perhaps the Oligocene, a pre-Miocene period), of certain alleged artefacts of stone, primitive, generalized, universal tools or weapons, called eoliths. These eoliths, subject of a great strife of words, are pieces of flint chipped curiously and suggestively and with a very plausible seeming of simple hand-held weapons of offense and defense, and tools of use in breaking bones, scraping skins, making more eoliths, and the like. If these eoliths are artefacts and not, as their deriders claim, the result of natural breaking, chipping, and rubbing agencies, then some animal of wit and of hands lived in Tertiary times.

The evidence against Tertiary Man is the fact that no actual man-creature fossils have yet been exhumed from Tertiary rocks, as well as that the earliest and lowest Primates, the lemurs, standing at the very base of that genealogical tree of which the anthropoid apes and man are extreme branches, did not appear until late Eocene (almost mid-Tertiary) time, while true apes did not appear until the Miocene. Also it is held against Tertiary Man that all of the many other Mammal species of Tertiary time are now extinct with the exception of two or three. Only the hippopotamus and a few others have come the long way. And these few are all Pliocene, that is, upper Tertiary species. No Eocene (lower Tertiary) nor Miocene (mid-Tertiary) animal species are alive to-day or were alive at the beginning of Pleistocene time. Whole families and genera of mammals that lived in the Tertiary are gone into the limbo of evolution's dropped threads. Shall we then expect Man, existent, if the eoliths are his handiwork, in Miocene and even Eocene days, to have persisted where all of his companions have been lost? Or, if so, would he not of necessity have come to something higher in culture than the primitive creature of early Pleistocene time? Could he have remained at so low a level unchanged through such almost inconceivable time as is represented by the Tertiary Age, and then have sprung so rapidly from primitiveness to high sophistication as we shall find that he has in the comparatively short period of elapsed post-Tertiary time?

For our present purpose, anyway, we may take Man as a post-Tertiary product. He is as that, in all conscience, ancient enough. In years—if we must turn to those insistent units—post-Tertiary Man cannot be less than one hundred thousand in age: more likely the number is five hundred thousand, possibly a million. And besides being ancient enough, he is, in the stage in which we actually first discover him, primitive enough. Let us indeed scrutinize him at close range in his own early time and place.

With the dawn of the Pleistocene, the first period in our present, so-called Quaternary, geologic Age, the geography and the climate of the earth were not what they are to-day. In Europe, for example, which is the land that has yielded most of the remains of primitive Man, the British Islands were joined to the continent, and the Atlantic coast line lay far to the west of present Ireland. Europe was joined to Africa where now the Straits of Gibraltar separate them. Another bridge of land linked Italy with northern Africa by way of Sicily and Malta and converted the Grecian islands into ranges of hills rising in a plain that extended south and east to the mountain plateau of Asia Minor. The Mediterranean was a landlocked inner sea, or rather was two such inland basins, and Africa, north of the Sahara, was practically continuous with southern Europe.

As to climate, a strange story is told by the ice-grooved earth. With the end of the Tertiary a world-coldness was coming on. Indeed it is this profound climatic change with its results of growing glaciers, and their results of earth sculpturing, that serves geologists as a convenient event to close one great earth period and open another. The closed one is the Manless—if really Manless—Tertiary; the opened one is the Man-dominated Quaternary. For with the Great Ice came Man.

Into caves where he died beside his more brutish companions, the cave bear, the cave hyena, the cave lion, and woolly-haired rhinoceros, present Man has forced a way and dragged out ancient Man's bones for scrutiny. His simple tools and weapons have been found, and rough drawings of his animal companions. All the way through the Glacial Period, and over not one but several continents, primitive Man has left his indubitable traces.

The time of the Great Ice was no short one: nor was it a single continuous time of ice and arctic winter. No less than four distinct Pleistocene ice times, with three separating inter-ice times, are determined for Europe. The great glaciers came and retreated again and again. The climate wavered from arctic through temperate to almost tropic, and back again. And through this whole time runs the early history of Man; now plain, now obscure, but ever manifest in some degree to the peering student of prehistoric earth.

In 1856 there was found at the base of an undisturbed stalagmitic layer near the mouth of a small cave in the Neanderthal (between Elberfeld and Düsseldorf in west Germany), together with the fossilized bones of cave bear, cave hyena, and woolly-haired rhinoceros, the skull cap and upper arm bones of a human being. The unusual character of these bones was quickly manifest to the trained anatomists who examined them. Without regard to the place where the bones lay or to the relics of the extinct animals that lay with them, the actual characters of the bones themselves were sufficient to betray them as the remains of primitive Man. This man was of low stature with a low skull of thick heavy bones, retreating forehead, dubious chin, and great brow and occipital ridges. He had a brain capacity of not more than 1,200 cc. This is 300 cc. less than the average present-day European, but 600 cc. more than the largest-brained living ape. This Neanderthal man, or *Homo neanderthalensis*, as he was soon dubbed, remains the classic example of early Glacial Man. But in the nearly half century that has passed since his discovery many other and more complete human fossils have been found.

In 1868 there was dug out in quarrying at the base of the north front of the Rock of Gibraltar a human skull with low cranial height, small brain case, protruding brow ridges, extraordinarily large round eye orbits, and broad nasal aperture. Human, but inhuman in its generally bestial characteristics.

In 1882 Mashka discovered in the famous Sipka cave near the village of Stramberg in Mähren (Austria) a wonderful *cache* of bones of cave bears, rhinoceroses, and mammoths, together with two thousand chipped flints, in all stages of making. And with these a part of a human jaw with several teeth. The osteologists prove the jaw to be that of an Ice Time child, heavy and large-toothed beyond any possible present condition. Many of the bones in this *cache* were burned and broken open for their marrow. It was a great camping and feasting spot of primitive man.

In 1887 two skulls were found in Spy cave in Belgium under a limestone layer, together with stone implements and bones of the mammoth, cave bear, cave hyena, aurochs, and reindeer. Fraipont showed that these skulls are essentially like that of Neanderthal.

In the cave of La Naulette, also in Belgium, was found in 1866 the now famous La Naulette jaw, plainly showing an unusual slightness of the eminences to which attach those muscles which we use especially in speech. The man of La Naulette was physically incapable of our facility of language.

In 1899 Kramberger found in a cave washed out by Krapina stream in Croatia, seventy-five feet above the present bed of the river, the remains of at least ten human individuals in a mass of burned and broken bones. He reads in his find the ancient relics of a cannibals' feast. Examining the same cave again in 1901 he found many scattered teeth, the under jaw of a child, and parts of other bones, all of Neanderthaloid type.

In 1908, which was a red-letter year in this fascinating search for the relics of Glacial Man, were found the now famous Heidelberg jaw, the child of Le Moustier (France) and the man of Corrèze (near Bordeaux). In 1909 Peyrony found at Les Enzies (France) the almost complete skeleton of a typical Neanderthal man; and in 1911 Henri Martin found, not far from Le Moustier, another Glacial Man in an earth layer dating from the very beginning of Pleistocene time. Full details of this most recent find have not yet been published, but it promises to be one of the most important of all.

These records by no means exhaust the catalogue of the finds so far made of early Glacial Man, but this is the list accepted by scrupulous Schwalbe as that of the certainly proved remains of a single common primitive type of Man, the earliest species of the genus *Homo,* called by him *Homo primigenius,* and now pretty generally known and accepted under that name.

Of all these relics the admittedly oldest (with the possible exception of the 1911 find) is the Heidelberg jaw, discovered by Schoetensack in rocks which seem fairly determined to be of a time between the Pliocene (Upper Tertiary) and Pleistocene periods. And this relic is by some human paleontologists held to represent a still earlier Man type than *Homo primigenius.* The jaw is so different from the present human form that its long past owner might have been of a type less than *Homo,* although more than ape.

That such a kind of ape-man or man-ape certainly once existed, the famous *Pithecanthropus erectus* of Dubois, the erect but stooping hideous man-beast of Java, is indubitable proof. Dubois believed his interesting find, made in 1891 and 1892, and consisting of skull cap, a left thigh bone, and two molar teeth, to be derived from Pliocene rocks, but the general opinion of geologists has reduced the age of these rocks to early Pleistocene.

The skull cap measures 185 mm. in length by 130 mm. in breadth, and indicates a cranial capacity of 1,000 cc., 200 cc. less than that of *Homo primigenius,* but from 400 to 500 greater than that of any living anthropoid ape. But the skull greatly resembles the anthropoid type. The smallness of the arch of the vertex, the low receding forehead, the occipital crest, and the specially strong projection of the supra-orbital ridges are all simian characters. *Pithecanthropus* has all the qualities of a missing link, even if it be not one in the precise line of human evolution. He is, indeed, held by Flower, Marsh, Virchow, Manouvrier, and other authorities to be the most man-like of the apes; while Turner, Cunningham, Topinard, and other eminent anatomists hold him to be the most ape-like of mankind.

Another set of finds of pre-human fossils, not yet popularly known, and indeed so far not widely accepted by scientific men under their discoverer's interpretation, but which are under any circumstances of extreme interest, are those of the indefatigable paleontologist of Argentina, Dr. Florentino Ameghino.

In 1891 Ameghino reported the discovery of numerous fossil remains of monkeys in Patagonia in rocks which he refers to the upper Eocene (lower Tertiary)! Among these fossils are certain ones that have an extraordinary likeness to the corresponding parts of Man, except that they represent ludicrously small creatures, animals indeed not more than twenty inches high. Of one kind of these miniature Man monkeys, Ameghino has the anterior portion of the lower jaw with the four incisors (broken) and the first three molars of the right side, of which two are broken. There is a well-developed chin, and the teeth are inserted almost human fashion. He called this creature *Anthropops perfectus.* Of another, called *Homunculus patagonicus,* he has part of a skull, including the left half of the face and cranium, a complete lower jaw with numerous teeth, a right femur, a left radius, and distal portion of a right humerus. As the femur is only three and a half inches long the small size of the whole animal can be readily inferred.

These forms, together with some others, Ameghino includes in a monkey family called Homunculidæ, which he holds to be a family nearer Man than the anthropoids. To prove his contention he catalogues twelve different characteristics of *Homunculus* and *Anthropops* which show their direct relationship to *Homo*.*

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* Ameghino believes that the anthropoids are degenerate descendants from an ancestor more like *Homo* than any one of them at present is, and that the primitive Man was not of the present anthropoid type, nor was he a descendant of any arboreal ape, but of a ground-inhabiting kind, and his body did not possess structural characters that go with an arboreal habit. He believes that the skull of primitive Man did not have occipital and supra-orbital crests, but was smooth, and was "low" chiefly in its character of extremely retreating forehead. He refers certain human skulls found in South America to lower and upper Pliocene times, and holds, therefore, that primitive Man certainly existed in lower Pliocene and probably in Miocene or even Oligocene time. The human skulls figured by him as of primitive Man of Pliocene times are probably deformed skulls of modern South American Indians. . . . [As I correct these lines in my completed MS., comes the regrettable news of Ameghino's death.]

To what small caricatures of ourselves would this South American student lead us! Yet the noble horse began likewise in lower Tertiary as a little four-and-three-toed animal no larger than a cat. Size is one of the simplest achievements of evolution.

But we do not care to have more to do with *Pithecanthropus* and *Anthropops* and *Homunculus*. We are all for real man; Man, primitive, but Man of our own genus if not actual kind. From the others we may take the lesson that before evolution could produce *Homo* she had to have travail with the *Pithecanthropus* sort. Man structure and nature are with absolute certainty the outcome of pre-Man structure and nature; an outcome naturally produced and naturally controlled. With this lesson from *Pithecanthropus* and *Homunculus* we may leave the blue haze of distant Tertiary time and what is certainly not Man, to return to the clearer atmosphere of the great Ice Age and to what certainly is Man, *primigenius* though he be well called.

From all these early glacial human fossils it is not difficult to reconstruct the whole early Glacial Man. He had a height of five feet and three or four inches, with long torso and arms and short legs. The leg bones were plump and more nearly circular in cross-section than ours, but with a thinner outer bone layer. The femur curved forward and the articulations were large and of a character to indicate a springy walk. Glacial Man did not go fully upright; this is shown also by the character of knee-joint and foot. The arms, too, were different from those of present man: the upper articulating face of the humerus was stronger and turned more toward the back.

The skull was thick-boned and heavy, with swiftly receding forehead, low absolute cranial height, angulated occiput, strong continuous orbital crests, large round orbits, a deep impression between the eyes, small nose bones with broad nasal openings with projecting margins, no chin, or only most dubious pretense of one, and a maximum cranial capacity of 1,250 cc.

The jaws were heavy, thick, and wide, slightly prognathous, and with strong ridges for muscle attachments. The under jaw was unusually large, with broad articulating surfaces. The trajectories, or sponge bone plates, in the lower jaw were very strong, this condition and the strong muscle attachments showing plainly a development for powerful mastication. On the contrary, the attachment ridges for the particular muscles of speech were unusually weak, and there were no special trajectories in the sponge bone behind these attachments, a condition indicating little special use of speech muscles. The lack of chin also indicates a limited speech.

The teeth were strong and large, with larger and longer roots than our teeth possess. The rear molars were especially strong, the molars growing larger from before backwards, which is the opposite of the present condition. The large deep enamel ridges and depressions of the upper surface resemble those of *Dryopithecus* (a fossil ape) and the living chimpanzee and orang. The nose was flat and broad; the face large and strong-boned. The whole aspect was bestial but human, humanly bestial.

All these characteristics are revealed by the actual remains of early Glacial Man. But certain other ones may fairly be assigned to him on the basis of a study of the more common "reversions" in present-day Man, and of characteristics still exhibited in some measure among the lower living races. Among these highly probable additional possessions or lackings of primitive Man are the presence of a well-developed muscle for flexing strongly all the digits at once, together with the lack of a special flexor muscle for the thumb; a less specialized hand and forearm and a better developed upper arm and shoulder; many anatomical features connected with a semi-erect posture, such as a smaller great toe, a more flattened arch of the foot, a less developed heel, smaller muscles of the calf and back, and better developed muscles for the independent action of the toes; more slender vertebræ and a less complexly curved spinal column, i.e., a column with a single great dorsal curve; the great foramen of the skull less inclined to the horizontal; lesser differences between the pelvic bones of male and female; an interparietal bone; the division of the frontal and temporal bones each into two; an intermaxillary bone; better organs of sensation, especially of smell, and an external ear capable of movement and the better collecting of sound. Glacial Man almost certainly had poorer speech than we have, but a louder voice, due to laryngeal sacs or resonators, and the female probably had more milk glands than now and gave birth to more young.

He was thus in every way more "animal" and less human than Man of to-day. He was, indeed, as Klaatsch well says, "an animal among animals." But he was, let us note at the same time, already master among his companions; he was already the king of the animals. The cave bears were his prey, the mighty mammoth fell to his crude weapons. His was the great advantage of having two limbs already freed from the demands of locomotion; free and modified to grasp rough stones, to flake and hold sharp-edged flints, to wield as clubs the branches of trees or the long bones of the great quadrupeds. And he had already the enormous advantage of the greater, the more convoluted, the better organized brain. He had a cunning and shrewdness that made all the strength and ferocity of the lions and rhinoceroses of little avail against him in the bloody struggle for life. "Animal among animals" but master of the plains of Pleistocene Europe!

But what of the higher life of this ancestor of ours? His philosophy, his religion? What were his family, his social relations? What his state of altruism, his attitude toward "arbitral or judicial settlement of international difficulties?" Had he our ways, our interests, our capacities? If "human nature is immutable"—and I have heard and read this phrase not infrequently of late—had he our human nature? Have we really his?

The facts that tell of the life of Glacial Man are the characteristics of his bodily make-up; of his handiwork, his tools and weapons; of his housing; of his feeding.

The structure of his body we have just studied. His only handiwork consisted of the utterly simple crude chipped flints that served him as generalized universal weapon and tool. Flaked off by blows or pressure till a sharp edge or a rough point was formed, with perhaps a half-shaped handhold at the opposite side or end, these chipped flints were the only aid to his hands in his exciting day's work. Quickly dulled or broken, they were thrown away whenever and wherever they became useless, to be gathered up by us to-day as precious ancestral relics. They lie now by thousands in the museums of the world. They have been scrutinized by our best eyes, arranged and classified into groups by their qualities of workmanship. Three defined types, named Chellean, Acheulean, and Mousterien, are recognized, and different shapes and degrees of fitness within each type. In the same region are found well-made flints and poor ones, generalized and more specialized ones. This means variability of capacity or habit within the primitive Man species; perhaps migrations or mixtures of different man races.

Special regions of abundant siliceous rocks were favorite gathering places for Glacial Man. In one place in west Flanders almost one-fourth of the present deposit of flint seems to have been worked over by primitive Man. Taubach in Germany was a great resort for him. Thousands of his worked flints lie there, and even a few roughly hewn bones of the sub-tropical animals with which he consorted, the cave lion, cave hyena, stag, bison, wild boar, *Elephas antiquus, Rhinoceros mercki*. These bone pieces are perhaps Man's earliest attempts at fashioning other weapons or tools than flints.

As to his housing, Glacial Man lived practically unsheltered. He was not even a regular cave inhabitant, as was his follower, the Man of the late ice and after ice times. He lived in the open, resorting to the shelter of a projecting ledge or rock crevice or cave if one was near when Nature was inclement. But he was a *Naturmensch,* and what Nature offered he mostly accepted unmodified.

He had fire, though. And likely he had skins; it is hardly conceivable that he did not. His immediate followers at the close of the Great Ice did. We know it by their rude picturings of skin-clad men. But *Homo primigenius* made no pictures, no rudest carving either of himself or of his animal companions.

Fire came to Man naturally, not by the brilliant thought of a primitive genius. A bit of dry stuff, dead grass or leaves, the pappus of flying seeds, ignited from a spark from the flint he was flaking, and Man had discovered fire. At first to his terror. Then, with repetition and chance appreciation, to his comfort and great advantage.

With fire he could prepare his kill for better eating. He could use meat more and raw vegetable food less. He could roast the long bones for the *bonnes bouches* of their marrow. His feasting places show the mighty eater of meat, prepared without vessels, without dressings, without the amelioration that we more and more demand. And they show, too, that this meat was not always flesh foreign to his own kind. The gathering at Krapina was a cannibals' feast.

For his food's sake and for his safety's sake Glacial Man was to the exclusion of practically all else a hunter and killer. His life was inseparably connected with that of his animal companions. Hanging on the flanks of the herds of wild horses, reindeer, and mammoth, with his hunting rivals the lions and hyenas, he killed and ever killed. One day he was gorged with food, other days hungering, as the luck of the chase ran.

His hunting carried him long distances. Glacial Man hunted over all of south and east England; over Belgium, France, Spain, Italy, parts of Germany and Austria. He hunted, perhaps as another race, but of the same primitive species type, over Asia Minor and Egypt and over the whole of India. If

Ameghino is not mistaken, he roamed the South American pampas, as still another subspecies or race. There was, too, an African race of *Homo primigenius* and likely a Mongolian one. Of a nearly uniform stage of culture, primitive Man showed the inevitable structural variability characteristic of all animal life, characteristic of Man of old and of Man to-day, just as of every animal kind that ever lived.

His culture was that of the exclusive hunter. Glacial Man had no agriculture, no flocks. He had not even made that first step in animal domestication, the making use of the wolves that howled about his fires as aids in his hunting or guards for his night camps. The dog, first friend of Man, first outcome of the human amelioration of the wild animals, was not yet come into existence.

Nor did his culture include the crudest elements of religion, at least as they are made discernible by any special care of the dead, or the building of rough altars or uncouth idols. Perhaps his cannibalism was that crude religious fancy of the absorption of the strength and courage of a dead man by the devouring of his flesh and blood. But it was more likely the simple hunger lust of the animal.

Glacial Man's dead were left where they lay, exposed to weather and wild animals. Their bones were broken and scattered. Thus it is, in part, why we have so few personal relics of our first Man species. But there is most probably another reason. He was actually few in individuals. Nomad, he roamed freely where the chase led, or the seasons impelled, dropping ever behind him and ever renewing his precious flints, and marking his days of great success by the bone piles of his feasting. Thus he gives the impression to the finder of these many flints and camps, of an abundant people. But it is only the *impression* of abundance.

He hunted in packs, as wolves hunt, for mutual advantage. Where one man was helpless before the large bulk of the mammoth, a score became the brute's masters. Here was mutual aid, the beginnings of altruism, if you like. But it was the animal altruism of the Russian pelicans that fish in circles, or of the beavers that build by common effort their needed dams.

Still, working together, there must for the while be truce among the members of a group. And to better manage the hunting they must call to each with cries of definite import; or make gestures when nearer the wary prey. Language was not far from this. But after the hunt was over it was likely man against man again, or perhaps group against group, for robbery of food, for use of a rock shelter, or to usurp a hunting ground or flint bed. They fought without rule or convention; fought to save life or to take life.

However it was not always fighting, even among different sorts. Kramberger believes that there are two slightly different kinds of primitive Man in his Krapina group of skeletons. And this group was feasting together. Also later, as we shall see, there are signs of a mixing, an interbreeding of races. Even the lion and the tiger may mate.

And thus, for the moment, we may take leave of *Homo primigenius* and his "human nature." If his nature be ours, then we shall indeed ever fight. "Animal among animals"!

CHAPTER III

HOMO PRISCUS: MAN AFTER THE ICE

No man can say just how long at any one time the Great Ice endured. It came, marching slowly but irresistibly, relentlessly, down from the polar ice cap, driving before it all plant life, animal life, and Man. And at the same time the glaciers of the mountains grew wider and longer and deeper. They moved down and spread out, covering all the rocks and valleys from the peak summits to far below on the mountain flanks, and even well out on the plain. Radiating from the center they formed a great inland ice cap that stretched away to meet the ice sheet from the north. Where life was caught between the freezing edges of the two it was extinguished. Whole genera and species were lost: of others only some individuals escaped that found their way around by one side or the other of the great Alpine ice mass. Over the whole land ruled the harsh climate of continuous winter. For thousands of years Europe was all winter.

And then the ice as slowly withdrew: the polar sheet to its polar fastnesses, the mountain tongues to the secluded gorges of the highest peaks. For other thousands of years it was summer: temperate, even sub-tropic summer. In the last, and perhaps in others of the inter-glacial times, the highest Alps were wholly free from snow and ice. A temperate vegetation and fauna ran to their very summits; at their bases flourished the luxuriance of a sub-tropic land.

It was in the first and second, especially the second, inter-glacial time, that *Homo primigenius* lived. He persisted through the second glacial time and into the third. We find his remains associated with the differing faunæ of all these earth-periods. But with the third, or last, inter-glacial time a new man appeared. Whether he was the direct descendant of the European race of *Homo primigenius* or was an immigrant race from another land, and there is much evidence for this, he was different. Different in structure, different in culture, and in both structure and culture what we should call higher, because more like us.

If a living species of animal get itself divided into groups of individuals that remain isolated in geographically distant places, this species tends inevitably to break up into several species. And if the environmental conditions of these isolated groups of individuals in these separated places are notably different, as colder in one place and hotter in another, dryer in one and wetter in another, generous of food in one and stingy of it in another, and so on, then the tendency of each group to become different from every other group—that is, the splitting up into different species, goes forward more rapidly. Or if all the individuals of one species come to experience a great environmental change, that whole species tends to change.

So with Man. And it can well be believed that the tremendous vicissitudes of the earth as an abiding place during the Glacial Epoch had their due effect on plastic man, as on all plastic animal and plant life. The stress of changing climates; the emigration of one fauna and flora, and immigration of another; the necessary adaptation of Man—who with his fire and wit would be less quickly compelled to yield his place for cold or heat—to these new and changing conditions of food and housing and animal companionship and life conditions generally, all meant inevitable change. And we see, from the advantage of our long perspective, this change actually appear. In the last inter-glacial time, and persisting through the last glacial time, which was the shortest and mildest of all the ice periods, and enduring and flourishing on for several thousands of years after the last ice time, there was a new, a different Man species. We may call him *Homo priscus.*

My friend the paleontologist gave a half-hour of his time the other morning to revealing to me the origin and flourishing and dying out of the animal group he specially studies. He showed me clearly by the differences in their shells, some of these differences gross and obvious and some delicate and subtle, the evolutionary history of the Ammonites, those most attractive and interesting and one time abundant and widespread mollusks that live now only in a single persisting generic exemplar, the pearly nautilus of tropic seas. Ranged side by side in little white cardboard trays, in deeper wooden drawers, were the fossilized remains of kind after kind of these disappeared animals. From rocks of Devonian Age on up to our own time, the delicate shells, septated and ornamented, first straight, then curving, finally closely coiled, have been dug out, and cleaned, and varnished and arranged in their little trays.

" Here is one that shows a new character," said the paleontologist, handing me tray and reading glass. " But you can see in it a dying-out old character. It is a couple of million years later than this one that shows the old character so plainly."

That is the kind of perspective I mean, when I say that from the advantage of our long perspective we can see Man really change. We can really see his evolution as animal species. The paleontologist unrolls the scroll of time for us, and points out on it the memoranda of our own history. He deals with time as the astronomer with distances. And despite the limitations of our experience, the visioning power of our brain lets us appreciate the realities and significance of the appalling dimensions of both of these cosmic functions. In the natural history of Man, time and change are two factors beyond our experience but within our comprehension.

Homo priscus differed from *Homo primigenius* in obvious characteristics. He appeared in larger numbers, although numbers still insignificant compared with Man of today or even of those days, still prehistoric but well revealed by archæologic records, that followed directly on the setting of his sun. He was represented by several fairly distinct European races, and probably more numerous extra-European ones. He was still nomad, but he roamed in greater groups, and he made larger and longer camps. Let us consider briefly his differences from *Homo primigenius;* first as to structure, then as to culture.

The roll of *priscus* fossils is longer, much longer, than that of *primigenius.* It is too long to call. In Britain, Belgium, France, Spain, Italy, Switzerland, Germany, Austria, he has left his bones and the abundant relics of his handiwork. In August and September, 1909, Dr. Otto Hauser exhumed, in France, from a previously undisturbed cave layer eight feet thick, an almost complete skeleton of this middle-time Man. The formations were of late glacial time, probably the last inter-glacial period. The skeleton belonged to a man in his forties, about five feet three inches in height, who differed in anatomical details throughout his body from *Homo primigenius,* but whose skeleton revealed many "low" characters that betrayed his primitiveness.

The head is long and narrow and the skull had a brain capacity much beyond that of *primigenius,* but it was still low in actual cranial height, with conspicuous though less enormous and not continuous orbital crests. The protrusion of the jaws is marked, and the lower jaw is heavy and still with an absence of our positive chin, but with at least something decidedly more than the complete wanting of one. The speech muscles have marked attachment eminences. The teeth are deeply worn from heavy mastication, but the last molar is smaller than the preceding one. The leg bones are more slender and straight than those of *primigenius,* and the arms differ markedly. The ribs are also more slender and they are higher, and throughout the skeleton the bones are lighter, and reveal what a German writer has called "eine bessere Oekonomie."

The fossil skeletons of Brünn and Predmost in Austria, Brüx in Bohemia, Goyet in Belgium, Schaffhausen in Switzerland, of Galley Hill and Tilbury and Suffolk in England, and those from a half-score caves and rock shelters of southern France and the Riviera, all add their mute testimony to the existence, the comparative abundance, and the wideness of spread over Europe, of the Man of the late Ice and early after Ice Time. And they all help to tell the story of his bodily make-up, more like ours than that of *Homo primigenius,* but, cheerfully we may say it, certainly *not* ours.

But Man of this middle time has told us of his personal appearance by another and most interesting means, namely by drawing and carving his portraits for us on bits of mammoth ivory, horn of reindeer, tooth of wild horse, and on the dark walls of his ancient caves. These few pictures and rude carvings tell us that their makers were unusually hairy and that some of them had beards. They tell us of women whose form of body suggests rather the ideal of beauty of the Central Africans than ours. From the " Venuses " of Brassempouy and Willendorf to those of the Melos and Medici is a sufficiently far cry, both as regards model and artistry, to make obvious to any one the long path Man has come from the Europe of the end of the Glacial Epoch to the Europe of now.

Of just one other of the human fossil finds of the period, besides that one of Hauser already described, need we speak in any detail. That is the pair of skeletons taken from the "Grotto des Enfants" near Mentone in 1895. These relics show such unmistakable evidence of their negroid character that anthropologists are practically agreed that they are representatives of a late Ice Man immigrated from Africa, and of a race, if not indeed species, well distinguished from the European type. This immigrant Grimaldi type of man, to use Verneau's name for him, suggests that even the European type of *Homo priscus,* appearing as he does so suddenly and so different from his predecessor of the earlier inter-ice times, may be also an immigrant, and not a direct evolutionary successor of *primigenius.* Indeed it is almost certain that at the time of the first appearance of *Homo priscus, Homo primigenius* was by no means extinct, and certain anthropologists hold that some of the late Ice forms, even Hauser's Aurignac Man, the very example I have chosen as type of *Homo priscus,* are hybrids or mixed races, due to the mating of immigrant Asiatic or African forms with the still persisting *primigenius.* Certain it is, however, that *primigenius* was soon extinguished, if not by ice or other inclemency of Nature, then by the new man, mutation or favorable variation of his own stock, or hybrid, or immigrant, who successfully contested with him his hunting grounds and shelters.

If the structural differences between *Homo primigenius* and *Homo priscus* are considerable, what shall be said of their cultural differences? Enormous is the only word for them. And yet that word should be saved to describe the next step, that from the culture of *priscus* to the culture of *sapiens.*

As a matter of fact the structural differences, though obvious to any, and really considerable in the eyes of the trained anatomist, would not by the layman be called exaggerated. And even less marked, in their external revelation, are the differences, as we shall see, between *Homo priscus* and *Homo sapiens.* Almost all of the characteristics of *priscus* can be discovered, one or two in a race, among the living kinds of man: his prognathism in the Australians, his low cranial height in the Veddahs and Akkas, his brain size even among specimens of our own proud Caucasian race. The old man of Cro-Magnon must have had a brain of more than 1,500 cc. Those of us with no smaller one are fortunate!

But the line of Man's evolution had, with the step forward from *primigenius* to *priscus,* already been determined to be a specialization of structure of a sort not readily revealed by external inspection, not plainly betrayed by obvious physical differences. It was a specialization of the structure of the nervous system, of the structure and mechanism that make for better brain functioning, for more efficient mental association and co-ordination. The *obvious* physical differences between *Homo* *primigenius* and *Homo priscus,* and more especially between the latter and *Homo sapiens,* or Man of to-day, are the unimportant ones. The real ones, the big ones, are the unseen little ones. But their reality is no less for their relative invisibility, and their importance is revealed at once by the behavior, the capacities and the cultural blossoming, in a word, by the life, of the new Man kind.

I have already referred to the drawings and carving of the new Man. Not many of himself—the discovered human figures can be hardly more than a score as yet—but abundantly of his animal companions, especially his more familiar ones, the mammoth, reindeer, wild horse, bison, musk ox. In the famous cave of Combarelles in the Dordogne (France), which is simply an old underground water channel worn through limestone rocks, seven hundred feet long, from one to two meters wide, and one to nearly two meters high, a dark tortuous channel in parts of which one has to go on all-fours to make progress, there are one hundred and nine drawings of animals by primitive Man. It is a wonder gallery of the oldest of the old masters.

Beginning about four hundred feet from the entrance, the walls on both sides of this cave channel, for the next three hundred feet, are covered with drawings from one to one and a half meters high, with their outlines often etched five or six millimeters deep into the cave rock. The one hundred and more figures include forty of wild horses, representing two races, fourteen of the mammoth, astoundingly accurate in outline and detail, two of the bison, and others of a form resembling the gnu, two of the reindeer, very true to nature, one of an antelope, one of an elk without antlers, two of the wild goat, and so on. Some of the figures are too indistinct to determine their models. Certain others seem more symbolic than descriptive, some even having the seeming of great letters or letter-like designs. Certain curious geometric figures with roof-like top lines have been interpreted as pictures of tents of skin.

In the neighborhood of this marvelous cave, its original describers, Capitan and Breuil, discovered, in 1901, another almost as astonishing underground picture-gallery cave, that now known as the Cave de Font-de-Gaume. Some of the figures—of which a total of eighty can be determined—are much smaller, thirteen bison being pictured on a space of only two and a half by three meters, while others were notably larger, as a bison figure two and seven-tenths meters in height. But the new point of great interest about these figures of the Cave of Font-de-Gaume is that they are colored, the artists having used colored earths, black and red ocher, deposits of which lie on the neighboring heights. The lines are often etched in and then painted over. In another such cave of painted pictures, four or five mammalian scapulæ with red flecks were found, as if they might have served as palettes!

The first of these cave drawings of late Glacial Man were discovered by Marcellino de Santuola in south France in 1878. Since then about twenty such caves with figured and pictured walls have been found, especially in southern France, northern Spain, and along the Riviera. But in none of these murals is the human figure represented.

The few attempts of late Glacial Man to depict his own body and face are by scratchings or etchings on ivory or bone, and by rare rough carvings and shapings of stone knife-handles, or primitive bone or horn tools and weapons. And also, and most interestingly, by a few curious crude statuettes.

Among these human figures there is an etching on reindeer horn of a naked man with javelin and two wild horse heads from the cave of the Madelaine, and another similar etching, from the cave of Laugerie Basse, of a hairy, naked man, also with spear and javelin, and apparently on his belly crawling toward a feeding bull bison. True hunting pictures these seem to be, revealing at once the day's work and the artistic capacity of *Homo priscus*.

Then there is the precious bit of animal bone, also from Laugerie Basse, in the Dordogne, with its etched fragments of the figure of a reindeer and a pregnant woman. And, most significant of all, the two already referred to ivory " Venuses " of Brassempouy and Willendorf, statuettes of primitive women, most unlovely in form and treatment. For Glacial Man's ideal of woman seems to be the woman fruitful, and the pre-Phidian sculptors of this dawning period of art have given form to this ideal, crudely but most unmistakably. All is neglected but the fruitful portions of the fruitful woman's body: the head without face, the legs without feet, the arms with the forearm and hand only in low relief; the rest of the body all in exaggerated fidelity to the ideal.

Well-known examples of animal carvings, classics of prehistoric archæology, are the etching of a mammoth on a bit of its own ivory, from the Cave de la Madelaine (France); the similarly etched " feeding reindeer " on a piece of its own horn, of the Kessler Cave of Thayngen (Switzerland); the horn dagger from Laugerie Basse (France), with ingeniously modeled leaping reindeer for handle; and the crude bird figure from Andernach on the Rhine, shaped from a basal piece of reindeer antler, in which the artist makes use of the natural bosses of the horn for the bird's eyes.

Besides being draughtsman, colorist, and sculptor, by a generous use of these terms, *Homo priscus* was given to a simple form of personal adornment by ornaments. Snail shells in chains, animal teeth or bits of bone scratched with parallel, diagonal, or zigzag lines in rows, or curved ones in concentric series, occur in the débris of his camps.

Our late Glacial and early post-Glacial Man possessed the beginnings of religion, at least that basic feature of it betrayed by special attention to the dead body. The corpse of the Aurignac Man had been disposed with some care in a particular position, and certain crude ornaments of mussel shell had been placed at his head and feet, besides some flints, a piece of red ocher, and some bones of the bison near his breast. Other skeletons show some slight protection over the head in the way of a few stones arranged to surround and cover it. Other corpses have had the flesh scraped carefully from the bones, and the bones themselves colored reddish with ocher. Certain curious small disks of bone or horn, carved and perforated, from late Glacial and early post-Glacial caves and camping places, have been discovered and interpreted by various ethnologists as amulets.

Late Glacial Man's industries, too, were far ahead of those of early Glacial Man, as revealed by new forms of flints, and simple tools of horn and bone. Needles, awls, whistles made by boring a hole in a phalanx of reindeer toe, and curious notched and perforated pieces perhaps used in connection with a thong of sinew to fasten his skin mantle over his shoulder, show the awakening of the developing human brain to the possibilities of helping his hands with conveniences not furnished directly by Nature.

Our Man of this time seems to have had

some faint beginnings of the now-so-well-developed custom of *meum* and *tuum*. Certain spearheads and harpoons show odd simple markings, which have been construed to be recognition signs of personal ownership, like our brands on cattle or the company marks on logs in a common flume. After a successful attack in groups on prey or enemies, the prized weapons, so long worked over, could perhaps be redistributed to their owners, or the right to the prey could be determined by the markings on the weapon that, of all that struck it, had found way to its heart. But beyond this possible beginning, primitive Man seems to have made no economies, no savings. What he had in his hands was his property, *weiter Nichts.*

With all these indications of the widening mental horizon, the increasing capacity, and the diversifying attention of *Homo priscus,* he was, far above all else, still the hunter and killer. His flints, of so-called Solutreen and Magdalenian types, are more elaborately and carefully worked, better formed, sharper, and, especially, more various for varying specific uses. There are spearheads and javelin points and harpoons. Not arrowheads, for Man had not yet risen to bows and arrows. But he was beginning to fight not actually body to body, as with the exclusively hand-held weapons of early Glacial time, but at little distances apart with hurled spears and javelins.

Besides the worked flints, there are simple weapons of horn and bone. In fact, there is manifest during the course of the flourishing of *Homo priscus,* first a marked betterment in character and increase in variety of the flints, and then a decline, due, undoubtedly, to the discovery and appreciation of the new resources in horn and bone working. Late Glacial and early post-Glacial Man was mighty as hunter, as the tale of his great camping places reveals. In the "bone pile" of Zeiselberg (Austria), opened in 1879, were found the remains of twelve mammoths, and many wild horses, reindeer, and rhinoceroses, together with hosts of well-worked flints of early Solutreen type. At Predmost, a camping place of note, the remains included bones of two dozen kinds of mammals, the mammoth, rhinoceros, wild horse, bison, wolf, stag, reindeer, beaver, musk ox, ice fox, etc. Fifteen thousand stone weapons of Solutreen type were collected here, and a human skeleton typical of *priscus*. From the Swiss cave near Thayngen the remains of two hundred and fifty reindeer and of twenty-three other animal kinds have been taken. In the great camp at Schweizersbild, at the foot of a protecting cliff, the skeletal remains of at least five hundred reindeer and half as many other mammal individuals were found. In other such piles remains have been discovered which show that post-Glacial Man descended to lowly food when pressed for it. Snakes, lizards, mice, and snails were used by him.

The great achievement of the hunting and killing Man of early post-Glacial time was the extinguishing of the mammoth. Indeed probably the vanishing from the plains of central Europe of the wild horse and bison is also the direct result of his relentless hunting. Just as we of to-day in our own enlightened land have wiped out a noble mammal, the American bison, and a beautiful bird, the passenger pigeon.

The mammoth he gradually hunted to extinction, first in south and middle Europe, then in Russia, and lastly in Siberia. Encased in the permanent ice of northern Siberia we are still finding the flesh-and-blood relics of the last of these great primitive hairy elephants. In 1901 Herz found a young specimen with blood in its body cavity and plants in its mouth. Over 20,000 mammoth tusks have been recovered and sold to the workers in ivory.

With the mammoth gone or going, Man next turned his murderous attention to the reindeer, and then to the wild horse and bison. This succession of mammal prey is shown not alone by the order of bone remains, but by the drawings and carvings; the figures of bison and wild horse, made later, are better than those of mammoth and reindeer. They are, too, the principal subject of the colored pictures, which were made later than the uncolored ones.

Thus we see Man from his very beginning exercising an influence on Nature. He has changed her order into disorder, destroyed her equilibrium, falsified her aspect. He has displaced her rocks and minerals, and above all exhausted her. Forest cuttings and forest fires, mining of coal and the metals, extinction of plant and animal kinds, these and many others are the incidents of one phase of Man's relation to Nature. And these incidents began with primitive Man. With the increase in numbers of individuals, which is plainly true of *Homo priscus* as compared with *Homo primigenius,* his demands on Nature became more positive, more various. He exploited her resources in more wholesale fashion. Instead of crassly isolating and tearing down a wild horse, he tricked bands of them into rushing out to the edge of a precipice and crowding themselves over. He invented successful lures for the smaller mammals, and combinations of effort for the effective capture of the larger ones. With each new calling on his wit, the exercise of it made it capable of still more elaborate devisings. The first advances in the use of wit were the hardest and slowest to make. With all later advance there has been acceleration. We shall see it with *Homo sapiens* in his short existence-time as compared with *Homo priscus,* and we see it in *Homo priscus* as compared with *Homo primigenius.* Man's wit was a great and ever-growing advantage over his great animal rivals for the dominance of the earth. Indeed they were no longer rivals; they were completely his subjects. His only rivals were those other creatures like himself.

And there were more of these creatures, in greater groups, in more varying condition, in more diversified race, after the Ice than during it. The rivalries of the groups of *Homo priscus* meant fighting. And fighting now was more varied in means. A man could be killed now by another at the distance of a spear throw. It was less and less absolute brute force. Skill and cunning were coming to the front. Combinations in fighting, which means battles, must have begun to be better managed. Tactics and strategy are words whose meanings must have had the rudiments of reality in the days of *Homo priscus.*

The imagination is strongly allured by what is revealed of the life and characteristics of late Glacial Man—this "*Realist durch und durch,*" this raw uncouth person of the caves and rock shelters, who yet had in him the spark of the idealist just coming to a faint glow from the workings of his developing brain. But the imagination must not be allowed to run. Or if it must have its way with one for a moment, what it visions must not be written down in a sober book of facts like this.

So we take up our further task of description and detail. With the disappearance of *Homo priscus* in the early after-ice time—for he did so disappear, with almost mysterious suddenness—who came?

CHAPTER IV

HOMO SAPIENS: MAN OF HISTORY

THE interesting and truthful answer to that closing query of the last chapter is simply: We came. We begin where *Homo priscus* left off. We did not begin, as ourselves, before that time. We did not exist before then, though animals much like us did. Just as dogs did not exist before a certain time, a time indeed almost coincident with our beginning, although their blood cousins, wolves, did. The parallel is not exact, because the first dogs were simply tamed, that is, man-subjugated wolves. And we had nobody to tame us but Nature—and ourselves. And I want now to say that I am no such scientific pedant, no such evolution bigot, as to refuse to recognize that Man has had a deal to do with making Man what he is. You will see that I shall recognize it fairly and fully, I hope. But indeed I should be almost as much of a bigot, a mechanicalist without hope of saving, a pedant beyond pity, if I did not recognize also that every other animal has had a considerable something to do with its own evolution. Le Dantec, the French biologist-philosopher, has given this simple fact a sort of emphasized conspicuousness by guising in the form of an equation, thus lending it the seeming of being part of an exact science!

He says, let us represent the animal individual by a and its totality of environment by b. But this can be true of only one moment of time because the influence of the fluxing environment at every moment changes the plastic a, while on the other hand a in its metabolism, its molar and molecular activities, its intentioned or unintentioned behavior, every moment changes b. Thus a and b become in the next moment a_1 and b_1, which become in the succeeding moment a_2 and b_2, and so on.

But a and b can never be considered apart, or rather a cannot. For a exists only by virtue of b; that is, b is actually an integral part of a. The formula for a living creature then is always $a + b$, or some modification of $a + b$. An organism is no fixed thing, for all its seeming so: it is a vortex unit in nature, of a most complex type. Into it are rushing constantly external materials and energies; out of it stream constantly these materials and energies, modified by the results of their own combinations. A candle flame, points out Huxley, holds its apparent fixity only by seeming: it is a center of happenings that continue under favorable conditions to be in one place in apparently one form. But it is simply a point of natural change.

So with an organism: a little more resistant, fortunately, to the conditions that would determine its non-persistence, but a burning, re-forming, struggling, changing center of very complex activities.

Now the very simplest of organisms seem to have little personal control over their behavior, using the word as biologists often do, to mean all that an animal or plant does. As we go higher in the scale of life, however, particularly animal life, we note a growing power of individual control. Tropisms, reflexes, instincts are there still, and all-powerful in some affairs of life, but coincidently with them there exists another control of the springs and course of behavior that we call intelligence or reason. This factor of control comes to its highest in Man, and is his glory. Out of it come self-consciousness, deliberate altruism, ethics, morals, religion, philosophy. And a degree of control of himself and of the Nature that he touches, that is undeniable.

This in turn permits a degree of control of his future as a species. And I am going to try in the last chapter, where my task is a sober looking forward to evolution's Man of to-morrow, not to forget that Man is, of all organisms, the one whose future lies to largest extent in his own hands. Now, however, it is simply my duty to set out, without analyzing their causes, some of the proved points in the course of his becoming, since the Great Ice, what he is to-day. This course has extended over a period probably of twenty or thirty thousand years, possibly of forty or fifty thousand.

It is a conspicuous and rather unfortunate fact in human natural history, that exactly where we should like some special clearness and abundance of testimony, and where, too, there seems no apparent reason in earth history why we have not this abundant testimony, it is strangely lacking. Between the time of *Homo priscus* and *Homo sapiens,* namely, between a time not long after the retreat of the last glaciers and a time considerably after that, there is a marked, if not very long-enduring, hiatus in the archæologic revelation of the life of Man. And this brings it about that between his Paleolithic culture, in which the students of prehistoric archæology include the culture of *Homo primigenius* and *Homo priscus,* and his Neolithic culture, which was the first culture of modern Man, *Homo sapiens,* there is a curious interruption —not a complete interruption, to be sure, but a most incomplete record.

Superposed on the geologic formations containing the latest relics of Paleolithic Man, those of his Magdalenian culture stage, there is found a formation of varying thickness practically barren of human remains or handiwork. Then come the formations rich in the relics of his much more advanced and complex Neolithic culture.

Some indications have been found, to be sure, of certain intermediate times and culture stages: the so-called Asylien and Arisien, Campignien and Tardenoisien periods of the prehistoric archæologists. But they are essentially Paleolithic in character, as compared with Neolithic culture. The energetic French student Piette has worked these periods so successfully that a few authorities are inclined to say with him that there is no longer a hiatus. But most hold, with Hörnes, that a considerable period of time in Man's proto-history is yet practically unknown through archæologic or anatomic material.

Among Piette's Asylien relics the most notable are the many well-made harpoon points, serrate-edged and with smoothly bored holes for fastenings; the curious *galets coloriés,* with letter-like colored markings; the fragments of what seems to be an extremely crude pottery; the abundance of stag bones replacing the reindeer bones in the camping places; the numerous very small, finely worked, pointed flints which seem to have been used as tooth-like attachments to harpoons, spear points, and perhaps fishing hooks; and finally a well-scratched drawing on bone, from the Mas d'Azil in southern France, of a naked and hairy man, or "anthropomorphic ape," as he is called by Piette. This name is based on the extraordinary shape of the head. But this can be nothing less than deliberate caricature on the part of the artist. Man of Asylien culture time was certainly no longer an ape. This figure, it may be added, has a strongly phallic character.

And now we come to scrutinize fleetingly the Man and the culture of the geologic time that we call our own, a time beginning, as I have already said, some twenty or thirty, or even fifty, thousand years ago. But long as it may seem when measured in units of years, it is very short compared with the time-stretches we have just been considering. Yet in it *Homo sapiens* has made those astounding strides in mental, cultural, and moral development which are the criteria of distinction between early Neolithic humanity and our humanity of the moment.

Homo sapiens is distinguishable from *Homo priscus* by structural differences which, if less marked externally than those which separate *priscus* from *primigenius,* are yet measurable and describable. They are, most importantly, differences in head structure that are plainly the indications of an increasing mental capacity, and a decreasing retention of such characteristics as low cranial height, receding forehead, absence or slightness of chin, heaviness of jaw, prognathism, and the rest of those too suggestive simian or pre-human traits.

Early Neolithic Man seems to have been

about as " human " in bodily make-up as we are. His brain capacity may have been a little less. Of six hundred and eighty-eight skulls taken from one hundred and forty different Neolithic burial places in France, the mean cranial capacity is 1,520 cc. The mean of the Parisians of to-day is about 30 cc. greater. But it is claimed that the skulls of the Egyptians of the Dynasties are on the average larger than those of the present natives of Egypt. However, the Egyptians of the Dynasties were by no means early Neolithic. They were late Neolithic, or, better, early Historic.

The Neolithic men were neither all dolichocephals or all brachycephals, that is, all " long heads " or all " short heads," for among these same six hundred and eighty-eight early French Neolithic skulls, fifty-eight per cent. are long heads, twenty-two per cent. short heads, and twenty per cent. middle heads, perhaps hybrids of the two better defined types. The insistence of the earlier anthropologists on the importance of long-headedness and short-headedness as indicating evolutionary rank in human types is probably rightly coming to be disregarded. Indeed it has been pretty fairly shown that difference of environment, and especially food habits, may be an immediately determining factor in this distinction.

Neolithic Man was light-skinned in Europe and western Asia, dark-skinned and negroid in Africa, and probably yellow-skinned and Mongoloid in eastern Asia. He had, in Europe, a slightly lower modal height than Man of to-day, being only three or four inches over five feet in height, rather than seven or eight inches, as is the mode of man of to-day.

There have been found in central Europe a number of Neolithic dwarfs. And Professor Kollmann has argued that they were our more immediate ancestors. But he is undoubtedly mistaken. They were a localized dwarf race, even as the living pigmies of equatorial Africa and of Dutch Guiana are. Although truly very primitive, these dwarfs are not the ancestors of the larger races, but are side lines of human evolution.

So much—or so little—for Neolithic Man's body. His culture, now. And here we find a greater, a much greater, contrast with the Man who lived before him. While a few cubic centimeters of extra cranial capacity are not very impressive, nor that addition to brain size necessarily very important (there have been too many small-headed wise men within our own knowledge), the subtler, finer, less visible and measurable, though not less truly structural, differences in the make-up and organization of the great nerve ganglion tucked protectedly away inside the cranial cavity, reveal their importance at once when we look to Neolithic Man's culture and compare it with Paleolithic Man's.

No longer a wild homeless hunter, or at best a troglodyte of chance caverns, Man of the first Neolithic time was a dweller in homes. No longer a nature-child living in the moment and on the hazards of each day's hunting, Neolithic Man was something of a harvester and something of an animal breeder. He stored up, and probably raised, two or three kinds of grain. He collected nuts and fruits. He domesticated and ameliorated the wolf to be the dog, the wild cattle to be the providers of his camp or village, as well as the wild sheep and goats and swine to be tamed and changed ones.

His tools and weapons were greatly increased in number and kind. Stone axes, rubbing and meal stones, crude black pottery incised in geometric patterns and colored in these lines with white powdered gypsum and then burnished by hand, combs of horn and wood, cups of clay, flat knives of stone, ornaments and amulets in great variety made of shell, bone, horn, stone, and wood; bows and arrows, lamps, buttons, needles, fish nets, reed baskets, etc. All the stone implements were, in contrast with the rough flaked products of Paleolithic Man, smoothly polished and symmetrically outlined. They have been picked up by the tens of thousands in Europe and

Britain, and are a commonplace in every museum.

Neolithic Man had some convention for the burial of his dead. He first interred them in convenient natural caves, then later came to making graves by digging holes or building up stone piles. He put tools, weapons, ornaments, and sometimes food with the bodies.

He used personal ornaments, especially necklaces. Indeed, the wearing of necklaces seems to have been a first step in the adoption of dress as a matter of adornment rather than necessary comfort. Statuettes of his making show the body often encircled by necklace or waist girdle when otherwise wholly nude. Mosso has pointed out that a careful study of the necklaces of fishbones worn by late Neolithic and early Man-of-the-Metals, should reveal much about the migrations and interminglings of these peoples. For it is evident that such treasures found their way to places far distant from that of their origin.

In later Neolithic time appeared those

highly interesting groups or tribes called lake dwellers, who lived in houses built on piles in the Swiss lakes, as well as abundantly elsewhere in lake or marshy regions. In Switzerland the sites of one hundred and sixty of these lake villages have been discovered; in Germany (including Lake Constance) fifty-four, in Austria eleven, in France thirty-two, in Italy thirty-six. Also in Italy some eighty or more *terremare* villages composed of houses built on piles, but on land, not in water, have been found. In some places the lake settlements persisted into the Bronze Age, and in France (Grenoble south to the Pyrenees) even into the Iron Age. Among the relics of the lake dwellers are the remains of seventy different species of animals used by them as food, including, of course, several kinds of fishes.

Of the migrations of Neolithic Man, and of his different races or varieties in Europe and Asia and Africa, simply no mention can be made in our space. The shell-fish eaters of Denmark, whose kitchen middens or shell heaps are a thousand feet long, two hundred feet wide, and three feet thick; the early Sardinian builders of the great monuments called *nuraghi;* the *broch* builders of Scotland; the *dolmen* makers of Brittany and elsewhere; all are Neolithic men whose life invites most alluringly that special attention we cannot here give them. Nor may we even outline the record of the swift progress in culture from the time of Neolithic Man's first appearance to his gradual transformation into Man-of-the-Metals, first of Copper, then of Bronze, and finally of Iron. It was, I can only helplessly repeat, an astounding progress when we contemplate by way of contrast the long period, five, perhaps ten, times as long, of the slow, painful, and then but slight, self-enlightening of his Paleolithic forbears. For Neolithic Man in his later days becomes the Man of the Ægean civilization, the Man of that now famous Cretan hill of Knossus, and of the glories of Mycenæ. He comes here not only to a blossoming that is his greatest achievement, but to a conjunction with Historic Man. There is no gap, no real gap, in the transformation of Neolithic Man to Copper Man, Bronze Man, Iron Man, and Historic Man.

Evans's earliest Minoan revelations are of a civilization dating back nearly ten thousand years. Pumpelly claims an equal antiquity for his excavated towns of Turkestan, between Lake Aral and the Caspian. The first Egyptian Dynasty was certainly of a time fully 4000 years B. C. Flinders Petrie holds it to be nearer 6000 years. And with all these civilizations distinguished for an efflorescence of human capacity that in certain aspects is even enviable by us to-day, Neolithic Man connects closely. Yet for the cultural development that leads him from his first or truly Stone Age up to the Age of the Palaces of Knossus, he had not many more years than we have had since these early Cretan days to become what we are in this Age of the Triumph of Science and Sense! Neolithic Man was of our type, our species, and of our capacity to learn, to change, to grow mentally and morally, to become philosopher and seer.

The tale of Man's life and development in the period of written history and of an archæology so well documented with materials as to be nearly equivalent to written history, is the familiar heritage of most readers. It is a tale to which the biologist and human paleontologist have little to contribute. It is told by students of Man who have another name. The biologist has only to accept its incidents as facts given, and to choose among them some that he may wish, if he has a thesis to illustrate, to make special use of.

For the moment, therefore, our consideration of *Homo sapiens* can be dropped after we have touched briefly on just one phase of present human life, a phase, indeed, that comes legitimately within the special interests of the biological student of Man. This is the matter of the present racial variety within the human species.

That Man is represented to-day by a considerable number of more or less readily distinguishable races, and that these races represent widely differing degrees of culture, and even of physical character, is common knowledge. If the fair-skinned Neolithic Man of Europe and western Asia is the direct ancestor of the ill-named Caucasian race, he certainly is not of the present native races of Equatorial Africa, of Ceylon, of Australia, of China, Siberia, America, and the Circumpolar Regions. These have descended likewise from Neolithic Man, but from races already different in Neolithic times from the blond form of Europe and Asia.

Some of these living variants of *Homo sapiens* are in a condition of culture hardly beyond that of his European Neolithic stage. The Fuegians of Patagonia and the unsophisticated natives of Australia use stone and bone implements of crudest character. The New Caledonians use polished stone and rough iron implements. The Veddahs of Ceylon have stone and bone knives, lancets, and hammers, but no stone axes, nor do they have any pottery. They are hardly beyond a Paleolithic culture. The Akkas and Bushmen of central Africa and the Papuan-Nigritos of Melanesia live in a stage of barbarism much like that of early Neolithic Man. As far as culture goes, and even structurally, these races are, indeed, a sort of living link connecting *Homo sapiens* with *Homo priscus.* The ideals of beauty of primitive Man, who drew and carved his steatopygous women figures, are those of the Hottentots of to-day. The " Hottentot Venus," whose remains are a conspicuous sight in the Paris Museum of Natural History, might have served as a model for the sculptor of the Brassempouy Venus. The culture of the Esquimaux to-day is such as to make Boyd Dawkins think them the direct inheritors by tradition, if not actually by blood, of *Homo priscus.* Klaatsch holds a similar view as regards the Laplanders.

But these few most primitive living races are only a fraction of the variants of the great, populous, successful *Homo sapiens* species. Different anthropologists and ethnologists classify and catalogue the existing human races differently, but they are in pretty fair agreement about the principal categories. Four basic great groups are generally recognized, namely, the Ethiopic, the Mongolic, the Caucasic, and the American. The Pacific Island-inhabiting peoples of Melanesia, Malaysia, Polynesia, and Australia may also be grouped together as a fifth or Insular and Littoral race. Each of these races is probably independently traceable back to Pleistocene Man. Within each one of these great groups are several sub-groups or branches, and in each branch are one or more stocks, while, finally, each stock may include several groups or peoples.

The differences among these races, branches, stocks, etc., are originally largely the outcome of different environments. By the early migrations of prehistoric Man the different parts of the great continents and the principal islands were successively reached and inhabited. But all these regions differ more or less from each other in their temperature, humidity, amount of sunshine or cloudiness, freedom from or prevalence of storms and rigorous conditions of life, abundance and kinds of vegetation, presence or absence of rivers, lakes, and ocean, etc., etc. These physical differences of environment, with their direct influence on food, clothing, shelter, activity, stress, have primarily determined, directly and indirectly, the stature, color, hair character, size of teeth, prominence of jaws, muscular condition, brain development, and other structural conditions on which race distinctions are made.

These structural conditions are, of course, intimately allied to physiological and mental and moral conditions, to behavior in the large sense of the word. Indeed, this alliance or relation is partly that of cause and effect. Ethnologists recognize physiological, psychological, and moral differences among peoples just as they do structural differences, and use them to help trace out racial and stock relationships. Likeness and unlikeness of language have, of course, been conspicuously used in such studies.

The great problem of nature *versus* nurture, or heredity *versus* acquirement, is insistently to the fore in any study of the relationships and relative standing in degree of civilization of human races. Is the superbly built, upstanding, high-browed Samoan of to-day a simple child of Nature because he lacks capacity, or because he lacks tradition and stimulus? I believe that it is largely because he has lacked environment, rather than heredity. And one proof is this, that he is not at all a simple child of nature where he has come into contact with those more sophisticated nature-children, ourselves. Through all the myriad Pacific Islands, the Polynesian of the "beach" is different from his blood brother of the interior. And the difference is essentially of the kind that separates us from the simpler races that we are wont to compare ourselves with. The world contact of these peoples has been simpler: the stress less. The Maoris, natives of New

Zealand, simple Polynesian race, almost as primitive in their life of a generation or two ago as our own forbears for some thousands of years, are responding with amazing rapidity and success to the stimulus and example of the modern civilization that surrounds them. Boas's recent book, "The Mind of Primitive Man," has for principal thesis the contention of the small differences due to heredity and the large differences due to environment and individual response, among living races.

But all of this is not to say that differences in capacity are not real among races. They are as real as they are among individuals of the same people. And these we all know at first hand. We do have gifts from the gods. These gods are our ancestors. But their generosity is usually tempered with wisdom, for they pass on their gifts with the injunction to use them if we would truly own them. And by our use or neglect of them do we enhance or impair them for our posterity. I am not unmindful of the "no inheritance of acquired characters " dictum of the Neo-Darwinian biologists. I am close enough to the modern studies of heredity to speak with a good deal of information before my eyes. And I repeat with deliberation that, in some way, directly or indirectly, human change is in some degree determined by human activities. We are a mutable species, and our mutation is not solely the outcome of purely fortuitous variations.

CHAPTER V

HUMAN NATURE, A PRODUCT AND SUBJECT OF EVOLUTION

THE search for origins is commonly looked on as a Darwinian diversion. I prefer to see it as a Darwinian duty. It is, indeed, one of our most interesting inconsistencies, that, as confessed evolutionists, we nevertheless manage pretty successfully to keep evolution out of our everyday life and thinking. Our biological theory of philosophy is Darwinian; our usual biological practice, Linnean. Like the great Swedish classifying and cataloguing naturalist, we are mostly content with a recognition of convenient differences and likenesses, according to which we give names to kinds and categories without troubling ourselves about their significance. We classify and catalogue, and do not interpret. The search for origins and for the courses of development from these origins to present conditions is left to the " specialists." And then, the offerings of their results, if disturbing to our usual acceptance of things as they are, are quietly put aside from everyday life as matters theoretic or academic. It is really becoming a duty for some devoted evolutionist to write a book on " evolution and everyday life," and to make it a book of protest. If we are evolutionists, we have got to accept the applications of evolution as well as the doctrine. We certainly do not, now.

The evolutionary biologist in his search for origins and lines of development has two principal recourses. He works from two principal bodies of fact, or sets of data, as he is likely to call them. They are facts phyletic and facts ontogenic. Or, to come into a more familiar region of the dictionary—and perhaps these dictionary conditions are not the least reason for evolution's staying out of everyday life—they are facts of ancestry and facts of personal individual development.

For example, our last three chapters have been given to an exposition of some of the known facts of human ancestry. They have not attempted to go farther back in this ancestry than the beginning of the genus *Homo*. It is perfectly legitimate, however, to inquire as to the earlier ancestry of Man. He is a member of the family Hominidæ. Whence came, phyletically, this family? He is a member of the class of mammals. But the Mammalia are certainly derived from less specialized vertebrates. What less specialized vertebrates? And the Vertebrata as a phylum are phyletically much more recent than the invertebrates. From what invertebrate group were evolved the vertebrates? The Annelids? Some zoologists think so. Others think differently. Truth is, perhaps, no naturalist less bold than Ernst Haeckel is willing, in our present state of knowledge, to talk very seriously of this earlier ancestry of Man. For the present purpose certainly we do not need to. But we do have a definite and reliable body of facts touching the ancestry of Man of to-day that conducts us plainly to a Man sort of yesterday who was very different structurally and culturally from us of now.

The other kind of facts that reveal much of origins and lines of evolutionary development is the ontogenic kind: the facts of embryology and immature stages as presented by each individual in its own life history. We are all familiar with the conspicuous incidents of our life from babyhood to maturity. There are revelations in that history. Revelations of structural change, but even more importantly of changes in mentality and soul. We might go farther back. Embryologists do. And their detailed descriptions of the structural character of the human embryo in its intra-uterine life afford further revelations, and revelations far more striking, as regards structure, at least. The physiology of the unborn infant can, of course, only be known in its very material aspects.

Now, these revelations of infant and embryonic life have their admitted significance. Since the succinct formulation by Fritz Müller and Haeckel of the "recapitulation theory," which is, simply, that individual development recapitulates race development, this significance has been both under- and over-estimated. We need not concern ourselves now as critics with this biogenetic law, but we should be blind to the teachings of science were we to disregard it wholly. However much the true ancestral stages in individual development may be obscured by the necessary swiftness of their repetition, or modified for adaptation's sake, or crowded out by wholly new interpolations of non-ancestral incidents, the fact remains that, in the large, ontogeny does recapitulate phylogeny. So we have ready to hand for undertaking our proposed fractional survey of the origins and evolution of human nature certain ascertained reliable information representing both of those bodies of facts on which the evolutionary biologist bases his reconstructions.

A scientific definition of human nature would make it include more, probably much more, than any popular connotation of the phrase. But it would at least include all that any popular definition would. And it is precisely those elements of human nature which are the ones most commonly in mind when the phrase is miscellaneously used that are the object of our present interest, even though the interest be professedly scientific in basis.

Human nature seems to be used chiefly to refer to certain "primal instincts," or elemental factors, that control in large measure our mental attitude, our *Weltanschauung;* indeed, that determine the conduct and trend of our whole life. It is human nature to love one's family and friends, one's race, one's country. It is human nature to be ambitious, to strive for place and power, to look out for number one. It is also human nature to be sympathetic, to be generous, to be altruistic. It is human nature to fight; also to succor and rescue. It is human nature to be superstitious, to fear the unknown, to guess about it, to symbolize and worship it. It is also human nature to be commonsensible, to want to know, to demand proofs, to refuse to follow unreason. And it is human nature to be and do a great many other things.

How have all these things come to be human nature? Many of these things are opposed to each other; some are stronger than others; there is reason and obvious use and advantage in some, and just as obviously lack of reason and no use, even disadvantage, in others. They have come to us as the heritage of almost inconceivable time experience and evolutionary change. They have come out of the distant antiquity of world history; out of the intense experiences of the contact of unnumbered generations of ancestors with a changing world, and ever-fluxing environment. They are the reverberations of the past struggles to live, of animals more or less like us, less like us the farther back they date their existence, more like us the nearer their days are to ours. They are the accumulations of that extraordinary biological memory on which are based our heredity, our capacity to develop from embryo to man, and our instincts. And all of them, or almost all of them, have been modified ever more and more by that growing, crowning, new capacity of ours, the intelligence, reason, self-consciousness, self-control. It is this particular human characteristic, unique in its flowering, if not in its actual presence in us, which makes our "primal instincts," our endowment from the past, much of which is a burden, somewhat amenable to modification and control, astoundingly swift and radical when compared with the way Nature brings about change and progress in her other children, the lower animals and the plants.

But some of these "primal instincts" we can never do without, nor need ever much to change. If we had not in perfect working order the instinct to suckle at our mother's breast from the day of our birth, blind, deaf, soft-brained, more witless and helpless than the young of the meanest animal in our farmyard, we should die as individuals, become extinct as an animal kind. It is more important to suckle than to be patriotic, to be willing to fight for one's country, to be callous to the sufferings of shot and sabered brothers-in-blood.

It is also an important primal instinct that leads us to defend and care for and uprear our children. On it, also, the perpetuation of the species depends, and the maintenance of that social development which has given our kind the dominance and the promise of higher things that it possesses.

But it is not such a necessary thing to defend our flag, especially when it waves far from home. Nor to try and put it over huts and peoples with their farms and forests and hunting and fishing grounds, still farther away. Nor even to defend our commercial supremacy, or our national honor, insulted in the person of some stupid consul, probably of another race; nor finally, even, to be wholly logical, to defend our own country. The Jew has no country, but he is a human success. You would not be a Jew. But he might not be you. I have lived—perhaps you have—in Italy, in France, in Germany, in England.

I love my own land better, but I have lived and can live happily and humanly successful in other lands under conditions slightly different from my home ones as to food, manners, names of coins, titles of rulers, and costumes of police. By humanly successful, I mean without any failure in the functioning of my necessary primal instincts or lack of stimulus to my growing desires for the higher human joys, and growing recognition of the higher human duties.

Human nature is not something forced into or upon us from the outside at some one supreme moment by some great mysterious molder of Man. It is not something fixed in us in one form forever. It is not something as old as the beginning of time, that shall endure till time's end. It is just the opposite of all these.

It is the slow accumulation and growth of centuries, of geologic ages. It is as old, but no older than the genus *Homo,* and for any one species of the genus is just as old as that species. It is older as *animal* nature, but not as *human* nature. It had its origin in lower animal nature and in many parts is still identical with lower animal nature. But its distinguishing characteristics are its modifications of, and additions to, the nature from which it has developed, evolved, risen.

It is something always changing, usually slowly, sometimes rapidly. It changes by loss, by modification, by accretion. There are in it now dying-out elements, changing elements, and incoming new elements. It contains ancestral vestiges, useless, even disadvantageous, just as the structural vestiges of our body. We know more than a hundred of the structural vestiges; the appendix, skin muscles, tail rudiments, hairy areas, etc., etc. No one has yet catalogued these vestiges in human nature, but they are equally real and many, and capable of being catalogued. Human nature is just as much and as truly a product and a constant subject of evolutionary factors as the human body is. In fact, human nature in strict scientific analysis is simply a function of human body. Without brain, man is without mind. With injured brain or lesioned nerve cords, man has a sick mind or incompetent sensation and reaction. Human nature is human mind. It is human tropisms and reflexes and instincts and habits and consciousness and reason and ethics and religion and philosophy. And these are human mind, which is a function of human structure, impressed and modified by age-long experience and evolutionary control. We have seen human nature change as we have scrutinized, from our vantage of long perspective, the life of *Homo primigenius*, *Homo priscus*, and *Homo sapiens*. We have seen Man's body change from the simian hideousness of *Pithecanthropus* to the low but truly human character of *Homo primigenius*, and on through the more human *priscus* to the most human *sapiens*. At the same time, and correspondingly, have changed his life conditions and his life capacities and activities. With growing brain came growing mind and growing soul; that is, growing, changing, human nature.

We have not attempted to outline that other and equally fascinating course of human change, the change from embryo to Man, the change in each individual in his own lifetime, this radical, swift change that, in some degree, pictures the changes of the race from times far earlier than Glacial Man. Part of this course of individual evolution is familiar to us all in its general and more obvious incidents, even if we have not, as have Preyer and Compayré, Perez, and the other child students, observed it minutely and analytically. The hidden part of it is less familiar, but it concerns less our present point.

This point is that just as the human nature of the species is a product of the evolution of the species, so the human nature of the individual is the product of the evolution, that is the unrolling, the adapting, and the acquiring, of the individual. Part of it he is endowed with at birth, either as an already usable instinct, like his suckling, or as a rudiment that will inevitably grow with his growing into a usable faculty. He suckles as the chick of the incubator begins its untaught pecking on the floor at every particle that may be food, the instant after it leaves the egg; or as the monarch butterfly, just issued from its golden-spotted, green chrysalid case, waits only to unfold and dry its red-brown wings, and meet its waiting mate, before it starts untaught and unknowingly, but driven by its biological memory, to quartering wide fields in search of the milkweed plant that alone can nourish the young that it will never know.

As the baby grows, the mother discovers soon in it the presence of certain unfolding capacities and of a certain type of disposition. It is true that from the first days that the child can understand in any way the meanings or attitudes of those it daily sees, it may begin to receive acquirements, its endowed nature be added to or modified. But it has much that it brings with it, although days, months, even years, must elapse before all of this endowment by inheritance reveals itself. Finally, there are those parts of the individual's human nature which must be looked on as almost exclusively of the character of acquirement. They must, of course, be based on an inherited capacity to make acquirement, but this capacity, unused through lack of opportunity or wilful neglect of it, will go unrevealed, and will of itself give little color or character to human nature.

The human individual comes into an endowment of tradition, of example, and of enforced training, that determines in enormous degree his human nature. The single acquirement of language, with all that goes with it, is enough to open such a gulf between Man and the other animals as to make human nature seem something almost of another category, and hence of another kind of origin from animal nature. But for nearly two years of his life Man has no language except bird sounds, mammal sounds, and gestures. He is taught the sounds and combinations of them that make language. I have a daughter fifteen months old who has sixty words. Of these but one is original with her. It is a simple, one-syllable, ejaculatory sound that she utters when she lets something fall. As a part of human language it is called the word "Oh." But it is really animal language. The other fifty-nine words of our little girl have been learned from us, and no one of them is yet spoken correctly. They are all still in process of acquirement.

If a human being is by any means shut off from his birthright of tradition, opportunity for imitation, and compulsion by example and training, his human nature is of a very low sort. He has his instincts and his capacities, but he is human, with a great deal of the humanness left out. Marie dei Medici knew this well when she robbed Henry's son of that which he needed to make him human. She simply kept him an animal. The foundling of Nüremberg was another example. However great the dower by heredity, the dower by acquirement is no less an integral and indispensable part of human nature.

The great differences among the living races of Man show this. I have said that the biologist has two principal bodies of fact on which to base his search for origins and lines of evolution. More accurately he has three. The third is the facts of comparative anatomy, the results of the intimate study and comparison of the make-up and characteristics of the living variants of the organic kind he is specially interested in. Not only may we study the ancestry of Man and his personal individual development, but we may study him in his living variety. The mode of his species, as most of us see and think of Man, is the mode of the Blond or Caucasian Race. But the modes of his other races may and do differ markedly from the Caucasian mode. And these differences represent, both in human structure and human nature, differences in degree of evolutionary standing, as well as differences in kind, lateral offshoots from the main evolutionary line. The differences in degree are, as I have suggested in the chapter on *Homo sapiens,* wholly comparable, though, of course, not identical, with the differences both of human structure and human nature which we have discovered in the study of

Man's ancestry. And these facts of comparative anatomy and comparative behavior confirm the interpretation of the course of human evolution as already made from the study of Man's ancestry and Man's ontogeny.

In certain living peoples we can see human nature in which the inherited instincts dominate; others in which there is a balance between the raw instincts on the one hand and the intelligent modifications of these instincts plus the acquirements through reason on the other; and still others in which human nature is so wholly the result of reasoned modification and acquirement that only those necessary basal instincts that have to do chiefly with the physiology of nutrition, reproduction, and the like, exist unchanged.

Human nature, then, to sum up, is composed of inherited reflexes and instincts, inherited capacity for modification of instinct and for acquirements by exercise of reason, and, finally, of the actual modifications themselves and dominance of instincts and the actual new accretions and acquirements in the way of behavior and attitude of mind and soul due to the exercise of our capacity for reasoning and conscious self-control. In the beginnings of Man, both his phyletic and ontogenic beginnings, the instincts dominate. Then comes on rather slowly and apparently painfully the dawning of the reign of reason and control. But the growth of this reign is an accelerating one, both as to dominance of instinct and acquirement of new things. Ever more swiftly and ever more easily comes on the rule of reason and soul. Until now the grown Man looks back with wonder to his childish animality and uncontrol, and the grown race looks back with horror to the brutish life of its Glacial time beginnings.

CHAPTER VI

FIGHTING, BATTLES, WAR, AND NO WAR

THE days of *Homo primigenius* were days of fighting. He fought with the great carnivores, the cave lions, and cave bears, and cave hyenas, for his life. He fought with the greater but less well defended mammoth, and with the bison and reindeer and wild horse for their lives. Their slain bodies were the chief subsistence of himself and his women and children. And he fought with his fellow kind, just as the lions and hyenas fought with their kind, for the privilege of place and food, and even for that of remaining himself uneaten: for the men of Krapina were cannibals.

This first human fighting was that of individual with individual; a fighting with small, roughly sharp or pointed, hand-held pieces of flint. Naked, hairy body straining to body, sinewy arm exchanging blow for blow, rude wit and strategy of personal struggle against that of the other red-eyed antagonist, the fight going horribly on till one or both creatures fall, a hacked and bleeding mass of brutal testimony to the great law of the Struggle to Live, as expressed in its simplest terms.

And we possess to-day, a hundred thousand or a half-million years later, in our human nature, still the remnants of the instinct for personal fighting that had its great development, because of its great necessity, in those raw days of the Early Ice. It manifests itself in different forms. It appears in the unsanctioned ones of the fighting sailor on shore leave and giving his instincts a short lease of freedom from the discipline of the ship; or in the drunken roysterer who has subdued his reason by narcotics, and thus given momentary freedom and dominance to his vestiges of animal nature; or in the still persisting human brute whose inheritance has been from a tainted or defective germ plasm, so that he is one of those variants of the human type far below the present mode of his race. It appears, also, and almost ludicrously, in those sanctioned occasions that are still, it seems, the necessary safety valve for the escape of the spirit of primitive Man from the body of *Homo sapiens.* Such occasions are afforded by Anglo-Saxon pugilism, by the German student *Mensur,* the French duel, the Spanish bull-fight, each with its sophistication of regulation and its effective restriction of personal danger. It is this sophistication and lack of danger that is making them all, pugilism, duel, bull-fight, each year more truly ludicrous as exhibitions of personal bravery or prowess. Their commercialism, too, is helping to kill them. They are already vestiges of human behavior.

Personal bravery is another thing, and is revealed in other ways. The fireman staggering through the smoke with his helpless burden; the locomotive engineer who sticks to his post to throw the reverse lever in the face of the warning glare of the approaching head-light; the crew of the lifeboat pushing out into the night of storm; the miners who grope about in the poisoned corridors underground for their suffocating companions; the jacky of the warship who rushes into the ammunition room to extinguish a horror-freighted spark; all these and the thousand others catalogued daily by the breakfast papers show that the degeneration of personal combat is not the degeneration of personal bravery.

There are, of course, and must be, perhaps, for all human time, occasions where this personal bravery must reveal itself in personal struggle. The burglar-assassin, the lust-maddened satyr, the drink-crazed assailant, must be repelled, if they get by the cordon of police protection, by every possible effort. With tooth and nail one will ever struggle for self or home. But that is not a blood-lusting going forth to fight, nor a sanctioned exhibition of ludicrous imitation of the good old times of *Homo primigenius.* The instinct for fighting is dying out of human nature—dying naturally for the lack of the stimulus of necessity, and being deliberately slain by the developing and dominating reason and soul of Man.

The biologist might look to Man in his immature stages for an exhibition in less atrophied condition of this disappearing trait of human nature. But the pedagogues, or some of them, have so absurdly overdriven their biological analysis of the child mind on the unstable basis of an imperfect understanding of the recapitulation theory, that I hasten to go widely around the subject. The spontaneous pugnacity of youth, its liking for lead soldiers and its literary preference for tales of ingenious murder, Indian scalpings, and sanguinary battle *may* be the remnants of the old fighting instinct, and then again may not be.

We are on safer ground when we look to the more primitive races of living Man. The fighting instinct is there in abundance, and personal combat is the essence of all their battling and war. The very simplicity of their weapons, just as in the Paleolithic days, compels this. But there is hardly a living race of Man that has not developed a condition and spirit and customs that make for live and let live. Family, tribe, and race have social and even altruistic corollaries in their human nature. They are well below our racial mode, but far beyond the mode of *Homo primigenius.*

When Man, after his amazingly long remaining in his lowest or *primigenius* stage, appears to us in his next or *priscus* stage, he had made that simple but important advance in fighting which enabled him to kill his prey and fellows at little distances. He had contrived spears and javelins. With sharp stone points bound to wooden handles he carried on his fighting with new resources. With his wits awakening he must, too, have come to the beginnings of strategy. The ambush, the attack in the night, the raid in numbers, perhaps the forced march, the fired jungle, the poisoned kill. One can, and with no undue license, imagine it all. And then came bows and arrows. Neolithic Man had these new weapons of distance, the precursors of the catapult, the gun, the cannon, and the mortar. To-day the engines of war wield their death strokes at the distance of miles, literally miles. In my newspaper of the other morning the war correspondent expressed his amazement that the Italians should have ventured their warships to such an absurdly close range when they wished to demolish the feeble plaster forts of Tripoli. They stood out only a little over a mile from these cardboard refuges of a hundred huddled Turks. Of course, the big ships used only their lesser guns.

The Japanese hurled their bombs over hills into invisible Port Arthur from a distance of five miles. At New York the other day our newest big gun in practice cast projectiles twenty-two miles oceanward. Twenty-two miles apart our modern warriors, unknown and unseen of each other, now make their fighting. It is, of course, a fight to destroy dollars, not men. Men may be destroyed, but only incidentally, as it were. A warship sunk or blown up is ten millions of dollars lost to the enemy. A big siege gun dismantled, is part of the way cleared toward the looting of New York, or toward its modern substitute, an indemnity for the necessary expenses involved in getting within looting distance.

When a civilized nation fights with a barbarous one, however, men may still be killed by primary intention. Kitchener's machine guns at Omdurman slaughtered Mahdists more rapidly than a modern abattoir slaughters hogs. And Menelik's Abyssinians killed by thousands and kept on killing the surprised Italians at Adowa. But the conventions of modern war among civilized nations, grudging concessions to the humanitarian busybodies, do not allow defeat to be converted into slaughter, and do not even contemplate slaughter as the primary object of the game. Nevertheless, the spirit of War is so essentially barbarous that its manifestation is likely at any time to be uncontrollably barbarous. Many incidents in the present course of the Italian-Turkish struggle over the bone of Tripoli have vividly illustrated this.

Neolithic Man, with his bows and arrows and his greater numbers, began to fight battles. He fought in large groups—more strategy, more ingenuity, more variety, more resources, in the fighting. He fought with horses to aid him. He called more widely on extra-personal help. Not his strong arms alone, nor his still used weapons of stone, polished, sharper, better contrived as to shape as they were, but fighting at distances in groups, fighting as armies, in truth. Historic Man of Crete, Mycenæ, Egypt, is the immediate descendant of Neolithic Man. He is Neolithic Man emerging into the light of history. And Man of the Ægean civilization had his armies, his fleets, his infantry and cavalry, his crude type of artillery. He made War as a whole people or nation.

The historic story of War is not for me to tell. You know it as well as I. The amazing ingenuity in the invention of means of fighting—means of offense, means of defense, means of swift movement, means of conducting long campaigns in distant lands: for one began to fight peoples far from home for the principal reason, usually, of their supposed defenselessness, coupled with their supposed riches. Also there began the differentiation of a people or nation into warriors and non-warriors. Not all should go out to fight, and for various reasons. The business of the people must go on or the war would be lost—for success in War was coming to depend on what it actually nearly wholly depends on now, the success in business of the same people. Then, too, there must be the perpetuation of a people provided for. And if all the able-bodied men engaged all the time or chiefly in War, there would be no such perpetuation. True, this brought up a new difficulty, that of the danger of reversed selection, the perpetuation of the people by the unfit, the weak, the diseased, the crippled, the tainted, unfit for the rigors of the campaign. But when the nation was large enough and had money enough it could send enough good men to War, and still keep enough at home for the perpetuation necessity. Or it could hire its fighters: the legionaries, the condottieri, and the Hessians that fought for cash. So War went on always, and ever it came to be mightier in its aspect: that is, its aspect of elaborate preparation and ingenuity of means, its numbers of men and of dollars, its ramification of interests, its hazy, accompanying cloud of diplomacy and intrigue, its scandal in management and conduct, its sensational exploitation.

And then and to the glory of Human Nature appeared in it, touching this matter of War, an aspect of Soul.

Human nature, I have said, is a good many different things at once. It seems sometimes to be at any one time mostly one thing. But it always is several, nay many things. And these things are a moving, changing, developing complex; a mass of results of influences that have been exercised on it, or exercised to produce it, from the first days of Man till now. And if for a long time, in the beginning, the awful result of necessity was a great development of the Fighting element in human nature, now the lessening, almost even to extinction, of that malign influence, and the ever growing importance of another influence, which is the altruistic one, the peculiar Man-distinguishing influence, have made Fighting and War to-day almost an anachronism, a vestige in human life.

The first appearance of Soul in War was the simple response of men to the physical sufferings of other men. One may imagine this coming early. For always there is that variousness of kind within the species, and even that variousness of feeling at successive times within the individual, that permits pity to lie next to bloodthirstiness, kindness to succeed, on the moment, brutality. And with the passing of the Berserker rage of the fighter, he may become the rough comforter of the victim of his own moment-madness.

The intrusion of Soul into War was inevitable because of two things: the growing, developing spirit of altruism and social consciousness in human evolution, and the fact that War is inevitably accompanied by atrocious and wholesale and perfectly obvious human suffering. This suffering was obvious to the fighters and to the stay-at-home supporters of the War. And it became more and more a thing that the developing soul of the human animal simply could not tolerate. Over and beyond all reasoned considerations of national economy, human welfare, racial development, and the rest, there is now—it has not always been; that is, it has actually come to exist in human evolution—a reason why War cannot persist as a human institution in the simple impossibility of Soul and such obvious, material, human torture, co-existing. There are other forms of human suffering as real, as wholesale, even more wholesale, than the tortures of the butchered victims of War. But we do not yet see them so plainly. They are less tangible, less red and howling in our eyes and ears.

So Soul began some time ago to modify War where it might without weakening too much the supposed effectiveness of this traditionally sacred institution of human progress.

Beside ammunition wagons, ambulances came on to the field, with attendants to pick up the mutilated incidents of the battle. There came to be field hospitals with surgeons and nurses for first aid, and headquarters hospitals with other surgeons and nurses and doctors for the long struggle to save to the people those members of it who had just been deliberately offered for sacrifice. These efforts were made by each people for their own tortured. Then came that beautiful outgrowth of internationalism,—or is it rather to be seen as one of the efficient factors in producing internationalism—the Red Cross. And then, and rapidly, the multiplying international conventions and agreements imposed by the Soul of the species against tradition, against a reluctantly dying instinct, and against the very essence of the spirit of the institution on which they were forced—those conventions to ameliorate or even inhibit, by law, the crassest forms of War's brutality.

And the next step was and is No War.

Darby in his " Modern Pacific Settlements" lists six international arbitrations in the eighteenth century, and four hundred and seventy-one in the nineteenth century. Since 1900 there have been (according to Myers) one hundred and fifty arbitrations, most of which have been held under the provisions of treaties. Many have been held without treaty provision. Most treaties limit the subjects of arbitration, but there already exist a few which include all cases of dispute between the agreeing nations. Denmark and Holland, and Argentina and Italy, have (according to La Fontaine) such treaties. Since 1895 one hundred and forty-five treaties between pairs of nations have been signed. Most recent and most conspicuous and important of all the modern agreements against War are, of course, the great arbitration treaties now pending between the United States and Great Britain and France. And most important of all the No War agencies should be the Hague Court.

But it is not only of to-day. There have been forward spirits in all historic time to whom Peace has seemed more human than War. One such man who ranged far above the mode of his kind in his time was an Egyptian king named Akhnaton. As Empedocles and Aristotle had visionings of Darwinism, and Democritus dreamed of chemical atoms, so Akhnaton visioned Man deanimalized and no longer slaughtering his own kind. But he, like the others, was seeing forward, and the Time was not come for the vision's realization. The time has come now, and hence it is so much more of a pity that one of the foremost warrior figures in our country, a man who has himself been a forward spirit in so many phases of humanity's advance, should reveal himself so backward a spirit in that phase of human progress in which the early Egyptian king was so advanced. In a recent editorial review of Weigall's "Treasury of Ancient Egypt," * Mr. Roosevelt makes special text of the immediate result of Akhnaton's visionariness, as a horrible warning to the similarly minded mock

* *The Outlook,* Sept. 30, 1911.

humanitarians of to-day. But in the very words of this critic is Akhnaton praised! "With the best of intentions and in the loftiest spirit," Akhnaton failed to make Egypt greater in terms of mailed might or territorial aggrandizement; for that is what is meant by "wrought incalculable harm to his native land," which are the actual words that complete the quotation.

At any rate the days of the Peace king of Egypt are not our days, and so accelerated is Man's moving along the path of his destiny in these later times of his evolution, these times of the increasing dominance of his mind and his soul over his body, and of acquirements over vestiges in his human nature, that what Akhnaton might not have been able wisely to do for Egypt, any ruler, be he big enough, may now do for his Blond people. The people would see in Akhnaton to-day a nearer exemplar of their present human nature mode, as regards War, than in an exponent of that older type of Man, though he live to-day, able "to recognize the grim facts of actual life."

I have no mind or intention to debate the defense of War. Only one special pleading leads me to an answer.

The personal defense of a nation's possessions is given as an example of necessary War. It is not necessary. For the aggression that creates the defense is not necessary. The War itself is not necessary. Only that part of it may be called necessary which is created by an unnecessary part, which really makes the War as a whole unnecessary.

The present internationally sanctioned daylight burglaries of Turkey by Italy and Persia by Russia are not necessary, even if their excuse, the advantage to Tripoli (and Italy!) and Persia (and Russia!), and to the world and to civilization, of the transfer, be granted. Desirable things may usually be achieved in other than a single way, or, if the only way is a bad way, some desirable things may well go unachieved.

On the other hand, the present War in China, an uprising of the people against a long anachronistic and oppressive administration may be more justifiably called necessary. Because it seems difficult to see how the reform of China can be otherwise accomplished. But it is of interest to note that Chinese conditions are not those of the human species in Europe and America, but rather are those of the Blond Race conditions of long ago. The Chinese are far behind the evolutionary mode of the Blond Race of the human species. And happenings there will be in China and among Chinamen to-day, which are really happenings of the kind and rank of those of yesterday in our own evolutionary experience. In this light a War of revolution may perhaps be looked on as necessary in China. For it is not that we hold Fighting and War to have been always unnecessary, always a monstrous evil, but that we hold it to be so now, among the advanced peoples of this age and stage of human evolution. Most assuredly fighting was a necessity in the days of primitive Man. It was, indeed, the necessity of it that produced it.

No adequate defense in reason has or can be made for the further continuance of the War institution. The chief defense of War, or the chief reason vouchsafed to explain why we must have it now and forever, is that it is a part of human nature, and human nature is immutable. I am writing this book chiefly to show that human nature is not immutable, but is, by the very character of its origin and means of being, absolutely, continually, and inevitably mutable. A thing may be in it to-day that was not in it yesterday; and the things that were conspicuous in it yesterday are no longer a part of it to-day. I speak now in terms of long days, of biologic, of evolutionary days, and I speak not of whims of an individual, but of the deep flux and living movement, the constant orderly change, which is the evolution of a species, an organic kind. Man is an incident of organic Evolution, and at bottom and in all great things his body and his nature are the product of this Genius of Life. And just as Evolution made him, with his need, a Fighter, and taught him War, so now, with the passing of this need, with the substitution of reason and altruism for instinct and egoism, Evolution will make him a Man of peace and goodwill, and will take War from him. And any man will find his greatest advantage and merit in aiding, rather than delaying this beneficence.

CHAPTER VII

HOMO SUPERIORIS: MAN OF TO-MORROW

THE future Man, the Man after the next glacial period—for we may, as some phenomena really suggest, be living only in the fourth interglacial time, even as *Homo primigenius* lived in the first and second, and *Homo priscus* chiefly in the third—this Man of a geologic to-morrow will certainly dig up, measure, and compare our bones and the relics of our handiwork and culture just as we dig up and examine those of our forebears. How different from himself will he find us and our weapons, tools, carvings, pictures, and the rest? Will he look with disgust on our still simian traits, but with gratification upon our considerable cranial capacity? With pity on our simple human beginnings, but be pleased to see in them the germs of those characteristics that are his own proudest possessions?

It will all depend, of course, on how Man evolves in the next several tens of thousands of years. How will he evolve? Is this a legitimate question for scientific men to try to answer? I maintain that it is.

Man to-day is certainly a product of evolution from Man of yesterday, and, looking still further backward if we like, from the pre-Man of day before yesterday. Man is little less now than yesterday the subject of this Genius of the Universe that is ever remolding and perfecting its products. Because one of our gifts from this Genius gives us the large illusion and even, in some measure, the reality of a partial release from its grasp, hence a partial control of and responsibility for our future, does that mean that we shall keep ourselves for all time like Man of to-day, a being for whom we have a good deal of admiration? Will not the Man of Quinternary times, the times to come, discover in us and in the evidences of our culture, an ancient type of Man and manner of life, differing from himself even as we find the Man of Neanderthal and Corrèze and Aurignac to differ from us? If so, how shall we differ from him? Or, put from our present point of view, how will the Man of ten thousand, twenty, fifty thousand years hence differ from us? Can we foresee with any degree of probability these differences, inevitable in body and nature?

In studying the evolution of groups or kinds of organisms we perceive readily and unmistakably certain directions of specialization, lines of descent. And for many of these descent-lines among the animals and plants we can see pretty clearly what is going to come. What may be called a canalization of possibilities by specialization lets us see what cannot happen—which is a way, by elimination, of letting us see what may or even must happen.

What is meant by canalization is this: Any group of organisms is by the very fact of its descent from another, a previous, group, endowed with an impetus of specialization along some already determined line. The farther along that line the parent group has come, the more precisely determined is the direction of evolution, the evolutionary fate, it might be called, of the new group. Its possibilities of divergence from this line are the more limited, the greater and more positive and radical the specialization of body and behavior already acquired. That is: the group, or kind of organism, moves on in a canal of sides higher and more impervious and closer together the more definitive the line of specialization, and the farther this line has already been traveled.

The generalized animal has a wide range of possibilities of becoming. It is in no canal: broad open ways radiate from its position in many directions. But once one way is chosen, the others are closed. As it moves along this way in geologic time and evolutionary change, the width and loose boundaries of the way become narrower and more definite; the way becomes a canal; the evolution of that group or kind of organism is canalized.

For years I have studied the structure, kinds, and habits of a considerable group of small degenerate insects that live as parasites on birds and mammals. Beautifully adapted for their specific habitat and manner of life, they are now a successful group. But a radical evolutionary change in the character of their hosts would mean practical extinction for them. They are too specialized, have gone too far in their adaptation, ever to be able to start again on a new way. They have lost their wings; their mouth-parts and alimentary canal are all specially modified for the successful eating of bits of hair and feathers; their feet are specialized for grasping; their bodies flattened to paper thinness; their eyes reduced to mere remnants; and so on through the list of all their parts. They are eminently successful parasites of birds and mammals; they can go on becoming even more successful along this line; but they can never be anything else.

That is, the evolutionary canal, although usually ever open in front, usually also grows ever narrower. It even sometimes keeps closing up behind. This means that an evolutionary way once well started on cannot ever be withdrawn from. Organisms steadily change, and this change among extremely developed forms in highly specialized groups has to proceed ever forward along the adopted way. Specialization leads to further similar specialization. Sometimes to over-specialization and extinction. The fate of the Irish stag that overdid it in the matter of antlers, and the great saurians of the Mesozoic Era that became too huge, should be ever in our eyes.

But whether change is to result in over-specialization or not, it steadily goes on and must go. The only relief is death; death for the individual; extinction for the species. In the cinematographic show of life, we see, as we look about us, but the revelation of a single flash, but the conditions of a single moment. A lightning glare in a night of tempest shows the bending trees and the whipping leaves at rest. We look at life evolution by the illumination of our short moment. And we fail to see its hurry.

But it is all movement, all change. Some organisms change more slowly than others. There are in the tropic oceans certain minute, one-celled animals which have changed little, in that monotonous and easy habitat, from the days of several geologic ages ago. But here in California there is a little beetle kind that is changing from a beetle of spots to a beetle of stripes under my very eyes. Fifteen years ago, two out of every three individuals, when miscellaneous thousands of this kind were examined, were patterned by spots alone, the other one having some of its spots merging to stripes. Ten years ago only two out of every four were all spots; while five years ago only one out of every three was all spots, two being partly striped. The change, I must confess, has not gone forward materially in the last five years. A little thing to us that a beetle in our garden should be changing its color pattern; but maybe an important thing for the beetle, and for us, at any rate, a demonstration of the reality of change.

Man, like the other organisms, is changing. Of that we may be sure. He has changed since the days of the Great Ice; changed discernibly, changed measurably. And this change has been along one obvious line of specialization. Man's possibilities of evolution are already canalized. He is beyond the generalized, protean stages of ameba, gastrea, pro-vertebrate, first mammal, first primate. The potentiality of Man has existed in all these successively. He is now the specific realization of this potentiality. He has adopted a direction and a kind of specialization, and has moved along this path a long way. He is the present type of a distinct and disparate line of descent. What has happened since *Pithecanthropus*, or something like *Pithecanthropus*, we know. What is to happen or may happen in the future is suggested. At least much of what will not happen seems pretty plain. Hence I say it is not wholly fantastic in a thoroughgoing evolutionist to pose to himself the question: What is evolution making out of Man? What is to be evolution's next product in the general line *Anthropithecus, Pithecanthropus, Homo primigenius, Homo priscus, Homo sapiens?* What is *Homo superioris,* evolution's Man of to-morrow, to be?

. . . . .

In all the different great evolution explanations—for while there is no question of evolution, there is some about its causes and methods—there is room for the species to have something to do with its own evolution salvation. There is much more in some than in others. For example, in the Lamarckian explanation, with its factor of the inheritance of acquired characters, the race may do a great deal, indeed, almost everything, for itself. In the Darwinian, or natural selection explanation, the species must in some way either escape from or modify or control in some measure, the automatic, soulless selection factor in order to be anything more than a helpless subject of an external master.

The degree of control by the species of its own evolutionary fate depends also greatly upon the particular character and present development of the species itself. A protozoan has less control than a mammal. And no other species has anything near the control, or the power of helping determine its evolutionary destiny, that Man has. Indeed, as far as conscious, future-seeing, soul-satisfying control is concerned, Man is the only species that we may be sure has any at all. He truly has.

But also as truly, this control is exercisable only within limits and in regard to certain matters. He can, for example, do much in this way by conscious selection and controlled heredity. But he cannot contravene any of the great fundamental principles of the order of nature, which includes the whole order of life and of life change, i.e., evolution. He can do great things for himself, but only within the possibilities of vital capacity and within the great evolutionary line or canal in which he finds himself launched by the very character and conditions of his origin.

But Man has an interesting source for self-modification, or, rather, for self-control of his individuals, if not his species, in the tradition factor. By actual evolutionary change is usually meant change so put into the species structure and character that it is inherited, passed on congenitally from parent to offspring. But the conscious environing, the teaching, the control by tradition of each individual as it grows and develops from youth to maturity, is a factor not without some potency in many of the higher animals, and that in the case of Man almost outweighs the more strictly evolutionary factors, the actual heritable controls. The endowment by tradition in Man's case is so enormous in quantity, so important in quality, and so consciously controllable, that on it greatly depends the future of Man's nature. In it lie tremendous possibilities.

So, in any contemplation of Man's evolutionary future there must be kept ever in mind three great determining factors, besides the present conditions of his specialization, that is, his present evolutionary canalization. These factors are, first, that of an automatic determinism by the cosmic causal agents of evolution; second, the factor of the self-controlling determinism of Man's own acquired consciousness and understanding working through conscious selection, control of heredity, direct influence of the acquirements or losses of the parents on their young, etc., and, finally, the imposition on both of these more strictly biologic conditions, of the stores of accumulated knowledge and qualities of soul that may be handed on in ever increasing mass and importance through the life of the species, by tradition, oral and written, of customs, of social consciousness and ethical realization. Man is, as I have said over and over again, a product and subject of evolution, but the factors of evolution are not single or simple. They are peculiarly many and complex in Man's case, and several of them lie almost wholly in his own informed hands.

. . . . .

Evolution's Man of to-morrow may lack

any one or more of the hundred structural vestiges that we now carry in our bodies. Let us hope the appendix may be among the missing! Other parts of him may become vestigial; he may have less or no hair; fewer toes; fewer ribs; a still poorer sense of smell, smaller ear lobes, perhaps other special sense organs degraded, for they are less and less necessary to the actual conservation of his life. Certain muscles may be lost; the teeth be farther degenerate. There are no suggestions of any gross physical differences in him except along lines of degeneration. His skull should be no larger; indeed, if anything, smaller. His brain is no longer increasing in size. It has not increased since Neolithic days, twenty thousand years ago. The evolution of the brain is no longer along the line of gross increase in size, but in a perfecting fineness of make-up and co-ordination, an increasing complexity of cortical layer, a greater specialization of its association centers.

The physical differences that another species of animal might look forward to, such as the life-saving perfection of its strength or swiftness or keenness of special senses, or the effectiveness of its weapons of defense and offense or its color patterns for protective resemblance, or what not else, are unnecessary to Man. For he protects himself from the rigors of Nature, dominates the animals, ameliorates the plants, and compels the physical and chemical forces to work for his safety and comfort and luxury, all by means of his wits. This splendid functioning of mind is, of course, based on a highly specialized and perfected structural condition of mind organ, namely brain and nerves, ganglion cells and conducting fibers. But this physical specialization is one which, in the present state of our microscopes and histologic technique, we can in no degree understand. The enormous difference in functioning capacity between the brain of Man and the brain of the nearest lower animal, for example, is hardly even suggested by the recognizable physical differences between the two. And yet they are there.

The unseen actualities in human make-up and life are to the seen as universe to sun.

This is well illustrated in connection with the highly important matter of our increasing resistance to zymotic disease, and immunity to organic toxins, involving structurally small, but physiologically immensely important, modifications of the blood and body secretions. Advance along this line has really begun. It will in the future go very far. The causal factors involved are two of those that Man controls; one, controlled restraint of the production of young by dangerously non-resistant individuals, the other, the immediate control of such diseases and the immunization of individuals on the basis of accumulated knowledge. By one means the race will be made hereditarily stronger; by the other a temporary strength may be maintained, while the slow actual racial betterment is brought about by conscious selection.

How a little biological matter—that is, little as our observation of structure and physiology goes—may be pregnant with enormous possibilities in relation to Man's welfare, is strikingly illustrated by the relation of the sporozoan malarial parasites to the mosquito hosts on whom they are dependent for distribution and even for their species' perpetuation. There are one thousand known species of mosquitoes. If an individual of any one of nine hundred and seventy of these species happens to pierce the skin and suck a drop of blood from a man sick of malaria, the living unicellular malarial parasites in that drop of blood will all die in the mosquito's stomach, killed by the digestive fluids. If, however, the blood-drinking mosquito happens to be one of the other thirty mosquito kinds, the malarial parasites will not only not die, but will be stimulated to an extraordinary physiological activity, resulting in a fusion, or simplest sort of sexual mating, between pairs of different forms of the parasite individuals. This fusion will in turn result in the formation of an active new single individual that will burrow into the stomach wall, and there produce hundred of active spores which will migrate into the salivary glands ready to flow out into the blood of the next man punctured by the mosquito, and thus inoculate him with disease. This slight physiological difference in the digestive fluids of two kinds of mosquitoes that are so much alike that it takes an entomologist and a microscope to distinguish them, means the difference between health and disease, between life and death, to millions of human beings. In a region where one of the few Anopheline malaria-tolerating mosquito kinds lives, Man has a mighty struggle to maintain himself. Death waits for him where the mosquitoes have stomachs tolerant of a microscopic invader that injures them hardly in the slightest. Man's future dominance of Nature will include the well-nigh perfect avoidance of all such dangers as this. And with this avoidance he will gain enormously in time and strength. He can stand, instead of lie in bed, and be a help, instead of a hindrance, to the work of his kind.

Man, then, suffers now little or no pressure from Nature making for any physical specialization except that of brain perfecting and organic modification for resisting disease. He lives now, and has lived since he had fires and furs and houses and weapons that kill at a distance, in spite of Nature; not conforming to her, but conforming her to him. Hardly any living men could live in a "state of nature" anywhere on earth except in the Tropics. But Man makes his own environment. He is the most adaptable of all animals, without actually adapting his body in the slightest. And where Nature's unkindnesses still trouble him at all, he is certain still to produce wonderful new phenomena of invention and control to ameliorate or nullify these discomforts.

Man's manner of evolution is tending ever more and more to make him in one sense less competent as an individual and more competent as a species. That is, he is tending strongly to such personal specialization along the line of division of labor within the social aggregate that he is giving up his generalized but real capacity for independent successful individual existence. Like the various zooids of the colonial jelly-fishes, or the soldiers of a termite nest, or the queen of the honey bees' hive, the individual gives up his competence for the "all-around" life for the sake of doing better a special part of the social or communal business. Savages are better fitted to live independently as individuals than too highly civilized men. Just as individuals of the specialized highly modified dog races of to-day are less generally competent than the wolves, their ancestors. But the combination of many civilized men or many specialized dogs is far more effective than the combination of many savages or many wolves. A group of specialists representing separately but in highly developed state all the different businesses of the species is better than a group of generalists, each representing in himself all the businesses, but in only inferior stages of development. Jack London makes a hero of Burning Daylight and a mock of the man at the desk. But London's own retirement from the all-around life to the specialized one of a thousand words a day is sufficient illustration of the ineffectiveness of his cry for the maintenance of the primitive Man.

There is, of course, the same danger in Man's specialization as in the high specialization of any other species. He has given hostages to the unknown future. He has sharply canalized his evolution possibilities. If, indeed, we are but in the fourth interglacial time, and the fifth great ice sheet is impending, such a catastrophic world-change might find us too far gone along our lines of adaptation to the world as we know it. But we are still greatly adaptable by virtue of our wits. And, perhaps, our wits might see us through. Certain it is that our bodies, apart from wit, could not. That is, we have got beyond the possibility of any actual bodily adaptation sufficient to adapt us to any considerable world-change.

But as long as our physical world remains essentially the world of to-day—and that is its probable fate for a time including all the future human generations we can profitably try to consider—the continuing and increasing social specialization and consequent interdependence of men will be the conspicuous feature in the evolutionary course of the species. We are, indeed, now far advanced in the deep and narrow canal that this path has already become. We are not as far along the canal of communism as those community insects, the ants and social bees. Nor, fortunately, is our way identical with theirs. Nor will it, despite the obvious analogies, ever come closer. But their condition is one interesting to contemplate in the light of our own sub-parallel evolution of mutual individual relation.

In one detail, an important one, the communal condition of the social bees—the common hive or honey bee, for best example—is biologically much more like the human condition, than is that of any of the other communal animals, or of any of the complexes of cells, or of organs, or of zooids, which are so frequently referred to as exhibiting analogy to the organization of human society. The complex of specialized cells that compose an animal's body, or of specialized zooids that constitute the colony or stock or compound individual of a colonial jelly-fish (Siphonophore), or of individuals that form most of the ant communities, all differ from the complex of individuals forming a human society, in that the units or community individuals in these complexes all show marked structural differentiation or specialization, specially fitting them for their particular tasks in connection with the division of labor which is the basis of the communal life. The units, however, in the human and honey bee societies do not show this condition or, at least, show it in much less marked degree. While there may be half a dozen or even more castes, or structurally differentiated kinds of individuals, in a termite community, each caste limited to its own special task or function, there are but three castes in the honey bee community, and but two in the human society. There are developed male (drone) and female (queen) and sexually atrophied female (worker) honey bees, with certain marked and constant structural differences among the three kinds. The workers, for example, have a dozen special modifications of their body to fit them for their various tasks of honey bee life. In the human species there are, of course, but the two types, male and female, and beyond their primary and secondary sexual differences, there exists no other structural differentiation of individuals associated with division of labor or function. Or if there are any such differences they are not constant, and are only slight differences acquired during the individual's lifetime in response to special habits adopted, and are differences not actually heritable, as such.

In the lower animals, then, division of labor is accompanied by differentiation of structure: in Man it is not. Each individual is fitted by body to undertake any function in the communal life. The differences lie almost wholly in the degree of inherited mind capacity and acquired mind development.

This last, of course, includes a great complex of various conditions and influences of environment. It is hard to teach even a capable honey bee to do things better. It is the conspicuous characteristic of Man to be teachable.

But despite the radical difference in kind and origin between the communism of jellyfishes, termites, ants, and social bees and wasps on the one hand, and the communism of Man on the other, the great evolutionary becoming and further trend of Man's life is communistic, a development of altruism, or, as the biologists put it, mutual aid, and of things based on mutual aid. The surrender of our generalized and independent individual life and the adoption of a specialized and, hence, interdependent life, is the chief behavior feature in the evolution of our species, as shown especially by the modes of the dominant Blond and Yellow races. This is an actual biological characteristic of the species Man, just as it is of all the species of social bees and wasps and of all the species of termites and ants. There are many "solitary" kinds of bees and wasps, many more than of social kinds, indeed, and there is a number of kinds, especially among the bees, that show clearly the gradation stages between a solitary and a communal life.

Now the condition of altruism and communism, established in Man by selection and heredity and strongly reinforced and elaborated by tradition, means that for the most effective and successful life of the Man-species everything tending to aid and develop this altruism should be encouraged, and everything standing in its way should be discouraged and weeded out. Man should help men —wisely. Charity should be reasoned. Men should take especial care of all useful individuals, of all clean-blooded, clear-minded, strong-bodied, disease-resistant, long-living individuals. From them should the race find its chief renewal, for through them, and through them alone, can the race actually advance; advance in terms of evolutionary time and evolutionary progress. This is the biological basis of rational eugenics. This is the biological basis of rational socialism, internationalism, pan-humanism, or whatever we may call the encouragement of and movement toward men's general kindliness, helpfulness, and fraternation toward all other men.

And this is the biological reason why the opposite of all these things is subversive of human evolutionary progress. Why mutual misunderstanding and distrust and egoistic rivalry; why rank unfairness in the distribution of opportunity and comfort and means of preserving personal health, vigor, and efficiency, and family integrity and happiness, and realizable possibilities; and why, above all, wasteful, brutal, atavistic slaughter of men, degradation of women, wrecking of children, and imperiling of race, which are exactly what, and everything that, War is, in its direct and indirect biological results, should all, all, be thrust out of human life as swiftly and as nearly absolutely as possible.

War to the biologist seems, above all else, stupid. It is so racially dangerous. It so flies in the face of all that makes for human evolutionary advance, and is so utterly without shadow of serious scientific reason for its maintenance. It is not natural selection in Man, nor in any way the counterpart of it. Its like does not exist in Nature outside the forays of the few degenerate fighting ant species, some of whom have lost the power of caring for their own young, and hence live as social parasites on less barbarous kinds, or have given up all other means of food getting than robbery by force of numbers. It is not only not natural selection, but its results are an artificial, unnatural reversed selection, one that turns on itself, giving no advantage to the conqueror, but only many and terrible disadvantages to victor as well as to loser.

It does not encourage bravery, but directly and positively robs the race of it. For it kills the brave, and preserves the coward to breed his kind. Hiring willing men to fight, victualing them, transporting them, burying them, is not a stimulus or an exercise of personal hardihood or bravery or human virility.

And no one asks nowadays, nor would it be possible if it were asked, for all men or even most men of a nation or people to fight. And if they did, the harm to the nation or people would be inestimably greater than the advantages of the physical exercise, the encouragement of physical prowess and courage, and the stimulation of war poet and singer.

As for the popularly imagined commercial advantages of War—of successful aggressive, bandit War, for no one has seen commercial advantage in unsuccessful defensive War—its fallacies have been so clearly pointed out by Norman Angell that these alleged advantages need no longer be referred to. Nor am I the person even to touch this aspect of the War stupidity. Its financial disadvantages, its economic injuries, even its moral disastrousness, are matters beside my intention, let alone my competence, to discuss.

But its enormous evolutionary disadvantage to our species, especially in the present high and hence critical stage of our development, and our amazing hesitation to wipe it out—for it is only an element of controllable tradition, not of ineradicable dominating heredity—are matters that the biologist can hardly speak temperately about. We are a reasoning species, and one of a certain amount of self-control. Why not, then, reason as to War, and act on this reasoning?

Inertia is the name of a condition or influence that penetrates all Nature, and has its place in all natural phenomena. In the physics of the inorganic world and the bio-physics of the organic, it plays a conspicuous part. In human behavior it is only too obvious. A majority of the physicians of the world now know that malaria is not a vague contagion of bad air, albeit the name of the disease, *mal aria,* came from the universality of this belief a generation ago, but they know that it is the result of a parasitic inoculation of our blood by infected mosquitoes. And yet a majority of the physicians of the world still treat malaria as if it were the thing it was once believed to be, and is not.

To-day the mode of the Blond race of Man knows that War is stupidity, brutality, economic absurdity, racial danger. But this mode, by the influence of inertia, allows its leaders to push the economic burden of War to such a monstrous load as never before, although it is almost certainly now ready to prevent any actual use, at least as between peoples of its own race, of this extraordinary development of preparedness for War. Inertia here is due to low leaders in high places: that is, leaders low in moral bravery, willing to compromise the future for the sake of being consistent with the past. Stand-patness, hesitation, near-sightedness, the ways that are, the inclination toward the path of least resistance, these are the forms of the inertia, or the elements that compose it, that just now is holding for the moment the evolution of the species in check. But it is only a momentary holding. For there is another part of the definition of inertia; another phase to the inertia influence. Not only does matter or Man "persist in its state of rest unless some force changes that state," but also they " persist in their state of uniform motion in a straight line unless some force changes *that* state." And Man has a uniform motion in a straight line toward an evolutionary goal, of which War is an absolutely impossible part. The motion of Man is toward mutual aid, altruism. War is all that these are not. These are life conditions that oppose all War. The inertia of the evolutionary movement of Man will overcome the inertia of the lessening resistance to this movement. War is already an anachronism in the life of *Homo sapiens.* The evolutionary mode of the Blond race has moved beyond it. The leaders will fall into the mode or fall out of their places. *Homo superioris* will be, whatever else he is,

BEYOND WAR.

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